The Dissertation Committee for Irene Trinette Jones Certifies that this is the approved version of the following dissertation:

Using Self-Directed Video Prompting to Teach Vocational Skills to Transition Age Students with Autism Spectrum Disorder and Intellectual Disabilities

Committee:

Mark F. O'Reilly, Supervisor

Terry S. Falcomata, Co-Supervisor

Sylvia Linan-Thompson

James Patton

Edmund Emmer

Using Self-Directed Video Prompting to Teach Vocational Skills to Transition Age Students with Autism Spectrum Disorder and Intellectual Disabilities

by

Irene Trinette Jones, B.A., M.A.

Dissertation

Presented to the Faculty of the Graduate School of

The University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree of

Doctor of Philosophy

The University of Texas at Austin

December 2015

Dedication

To my husband, James, and my five wonderful children

Kristy, Kimberly, Katherine, William, and Elizabeth

In Memory of Alma E. Garcia

a truly dedicated and gifted educator

7/30/49 to 6/18/15

Acknowledgements

I would like to take this opportunity to thank all of the people in my life who have made this accomplishment possible through their love, support, and encouragement, without which I would have been lost. There is no way I can possibly acknowledge everyone who has been instrumental in guiding me through this journey.

I cannot express enough thanks to my committee for their patient guidance, enthusiastic encouragement and useful critiques: Dr. Mark O'Reilly, my committee chair; Dr. Terry Falcomata; Dr.Sylvia Linan-Thompson; Dr. James Patton; and Dr. Edmund Emmer. I offer my sincere appreciation for the learning opportunities provided by my committee.

The completion of this project could not have been accomplished without the support of my friends and classmates, Christine, Sonia, Nigel, Deanna, and Mary; and my five children (Kristy, Kimberly, Katherine, William and Elizabeth). To William and Elizabeth –I especially want to thank you for understanding when I needed time away from playing with you to study, conduct research and write. Thanks to my mother, Barbara for providing management of the household activities while I completed my work. Your support will not be forgotten.

Finally, to my husband, James: my deepest gratitude. Your constant encouragement and support are much appreciated and duly noted. It was a great comfort to know you were by my side. Thank you for the countless hours you spent listening to me, providing me with a sounding board, and urging me to get done!

Using Self-Directed Video Prompting to Teach Vocational Skills to Transition-Age Students with Autism Spectrum Disorder and Intellectual Disabilities

Irene Trinette Jones, Ph.D.
The University of Texas at Austin, 2015

Supervisor: Mark F. O'Reilly
Co-Supervisor: Terry Falcomata

Employment is an influential factor in the quality of life for individuals with intellectual and developmental disabilities (Lewis, 2011), but securing and maintaining gainful employment is difficult. According to the U. S. Department of Labor (2013), the rate of employment for individuals with a disability was 30% while the rate of employment for those without a disability was 76%. According to the American Community Survey (2011), the percentage of working-age people with an intellectual disability working full-time/full year was only 11% (Erickson, Lee, & von Schrader, 2012). Kaye and colleagues (2011) found that employers are reluctant to hire and retain workers with disabilities due in part to the cost of accommodations, need for supervision, the lack of skills, and the ability to perform a quality job.

The importance of improving the vocational skills of students with disabilities has been highlighted in the provision of Individuals with Disabilities Education Act (IDEA) which stipulates the use of scientifically-based practices to address skill deficits during

transition planning. A step toward achieving these transition goals has come from the use of visually-based technology. Existing research suggests individuals with disabilities can benefit from vocational training delivered via affordable assistive technology (Furrnis et al., 2001). Commercially available handheld touch screen technology has the potential to reduce employers' cost of providing accommodations by equipping workers with tools designed to teach them vocational skills, thereby enabling them to produce and maintain high quality performance with minimal need for direct supervision.

This research examined the use of self-directed video prompting (SDVP) strategies to increase the acquisition of vocational skills for transition-age individuals with autism and mild intellectual disabilities through the use of a multiple probe across tasks design replicated across four participants. The results indicate all four participants acquired and maintained novel vocational skills, independently operated a handheld device from beginning-to-end, and transferred prompt dependence from the trainer to a handheld device. Results further showed that all participants assessed 10-weeks after the cessation of the intervention phase successfully generalize newly acquired skills to untrained settings and materials at 100% accuracy.

Table of Contents

List of Tables

List of Figures

CHAPTER 1

INTRODUCTION

Many students with intellectual disabilities (ID) take longer than their peers to acquire basic skills, requiring repeated exposure to stimuli and intense training (Van Laarhoven & Van Laarhoven-Myers, 2006), thereby consuming significant and scarce resources in the form of assistance (by teachers, job coaches, and caregivers), time and funding. Indeed, the National Longitudinal Transition Study of Special Education Students (NLTS2) continued to report dismal postsecondary outcomes for students with intellectual disabilities when compared to earlier reports (i.e., NLTS reported 8.3% with postsecondary education, whereas the NLTS2 showed a slight decrease to 6.6%; NLTS reported 25.4% have post-school employment, whereas the NLTS2 showed a slight increase to 28.4%; and NLTS reported 4.3% achieved residential independence, whereas the NLTS2 showed a slight decrease to 3.0%), prompting a concerted effort to scientifically determine the most effective and efficient instructional methods of preparing this population for the responsibilities of adulthood (Blackorby & Wagner, 1996; Bouck, 2012). Failure to teach functional life skills negatively impacts the overall quality of life for the individual (Sigafoos et al., 2005); therefore, it is beneficial for educators to focus on teaching critical life skills that promote independent functioning as early as possible (Wehman, Smith, & Schall, 2009). Knowing this, educators are under constant pressure to find more efficient and effective teaching strategies to reduce their students' dependence upon others and to prepare them for the challenges of independent living.

The importance of improving the adaptive behaviors and functional living skills of students with intellectual disabilities has been highlighted in the provisions of Individuals with Disabilities Education Act (IDEA) which stipulates the use of scientifically-based practices to address skill deficits during transition planning. A step toward achieving these transition goals has come from the use of antecedent-cue

regulation and picture-cue strategies which have been commonly used with students with intellectual disabilities to teach the self-management of a wide array of independent living and vocational skills (Connis, 1979; Copeland & Hughes, 2000; Krantz, MacDuff, & McClannahan, 1993; Sowers, Rusch, Connis, & Cummings, 1980; Sowers, Verdi, Bourbeau, & Sheehan, 1985; Thiemann & Martin, 1989; Wacker & Berg, 1983). The success of self-management strategies using external change agents combined with advances in technology has led researchers to search for new ways of assisting individuals with disabilities to independently perform tasks previously thought beyond their capabilities.

Many individuals with developmental disabilities benefit from visually-based technologies because this technology (1) takes advantage of their relative strengths in visual-spatial processing and preference for visual stimuli, (2) mitigates deficits in auditory processing (because auditory cues are transient), (3) avoids stimulus over-selectivity, (4) provides routine and predictable sequences of activities, and (5) reduces social interactions (Burke & Cerniglia, 1990; Mesibov, Shea, & Schopler, 2004; Webber & Scheuermann, 2008). Several types of visual prompting strategies have been used with this population. Visual prompting strategies can include watching a model of an entire task from beginning-to-end with voice-over instructions, known as video modeling (VM); watching oneself model the task with voice-over instructions, known as video self-modeling (VSM); watching a model of a segment of a chained task with voice-over instructions, known as video prompting (VP); or viewing images on a card, known as static picture prompting (SPP). Although video modeling has been supported as an effective strategy for teaching a variety of skills to both nondisabled and disabled populations, it has been shown to be less effective than either static picture prompting or video prompting for teaching skills to severely disabled populations (Cihak, Alberto, Taber-Doughty, & Gama, 2006; Van Laarhoven & Van Laarhoven-Myers, 2006). Static picture prompting is challenged by its inability to depict complex actions using still

images; whereas, video prompting captures the natural movements required to complete a task and can be designed to display information in a concise and discrete manner while addressing the unique characteristics of lower functioning individuals.

Summary and Purpose of the Research

Unemployment or underemployment is a problem for individuals with intellectual disabilities. According to the U. S. Department of Labor (2013), the current rate of employment for individuals with a disability was 30%; whereas, the rate of employment for those without a disability was 76%. However, according to the American Community Survey (2011) the percentage of working-age people without a disability working full-time/full year in the United States was 55.5% while the percentage of working-age people with an intellectual disability working full-time/full year for that same period of time was only 11% (Erickson, Lee, & von Schrader, 2012). Securing and maintaining gainful employment is an influential factor in the quality of life for adults with intellectual and developmental disabilities. Beyond the financial benefits associated with competitive employment, research suggests that individuals with disabilities experience other benefits such as higher job satisfaction, increased self-determination and self-esteem, and increased social interactions within the community (Lewis, 2011). Through the use of assistive technology supports, individuals with intellectual disabilities and autism spectrum disorder (ASD) can benefit from vocational and life skills training. Furniss and colleagues (2001) documented similar beneficial outcomes (such as, increased social interactions, acceptance within competitive work environments, and positive self-image) with the extended support of assistive technology despite individualized limitations. Siperstein, Parker and Drascher (2013) stated, "Employment has come to be viewed as the benchmark for assessing the success of special education" (p. 158).

Research data supports several effective teaching strategies for promoting skill acquisition and generalization without the costs and impracticality of teaching in multiple environments (Haring, Kennedy, Adams, & Pitts-Conway, 1987). Specifically, using a

variety of self-management strategies via assistive technology, such as variations of VM, SPP and VP, has led to greater acquisition of independent living skills, such as purchasing, washing dishes, doing laundry, and preparing food (Cannella-Malone et al., 2011; Mechling & Gustafson, 2009; Van Laarhoven & Van Laarhoven-Myers, 2006) and also a variety of vocational skills, such as wiping tables, cleaning mirrors, and cleaning windows (Copeland & Hughes, 2000; Van Laarhoven & Van Laarhoven-Myers, 2006). These instructional strategies have been previously reviewed (Baker, Lang, & O'Reilly, 2009; Banda, Dogoe, & Matuszny, 2011; Mechling, 2008); however, a synthesis of the isolated use of video prompting procedures to teach independent living/vocational skills to transition age persons with intellectual disabilities and autism spectrum disorder has not been previously conducted.

The purpose of this dissertation is to examine the effectiveness of using video prompting strategies using a handheld device to increase the independent completion of a variety of vocational tasks among transition age students with autism spectrum disorder and intellectual disabilities. More specifically, this dissertation will seek to answer the following questions:

1. Can transition age students with autism spectrum disorder and intellectual disabilities use self-directed video prompting (SDVP) to acquire novel vocational skills which require them to independently complete complex chained tasks?
2. Will participants generalize newly acquired skills to untrained settings and materials with the use of the iPod Touch® without additional prompts from the trainer?
3. Will participants maintain performance levels over time with the use of the iPod Touch® without additional prompts from the trainer?
4. Will stakeholders (e.g., participants, teachers, etc.) consider SDVP a socially valid intervention?

CHAPTER 2

EVALUATING VIDEO PROMPTING: A REVIEW OF THE LITERATURE

The purpose of this review is to examine the effectiveness of video prompting as a teaching strategy to increase the acquisition and independent completion of daily living/vocational skills. This review differs from previous reviews of video prompting by highlighting the importance of video prompting strategies used to teach independent living/vocational skills to transition age individuals with moderate to severe intellectual disabilities.

Method

Search Procedures

Systematic searches were simultaneously conducted using the EBSCO databases: Academic Search Complete, Education Resources Information Clearinghouse (ERIC) and PsycINFO. The keyword fields were searched with the phrase (video prompt* or video technology and prompting or videotape instruction) and (developmental disabilities or mental retardation or intellectual disabilities) and (independent living or skill development or skill learning or self care or vocational skill). Following the electronic database searches, an ancestral search of the reference sections of studies meeting the inclusion criteria was performed to identify additional studies for possible inclusion.

Inclusion Criteria

Articles identified for the current review met the following criteria: (1) an intervention was implemented in the study; (2) an individually administered video prompting procedure was required (however, studies could include a comparison of interventions); (3) interventions targeted and measured the acquisition or improvement of an independent living/vocational skill; (4) studies included at least one individual who was at least 14 years old (i.e., transition age) and diagnosed with an intellectual disability including individuals diagnosed with co-morbid disorders (e.g., ASD); and (5) published in English in peer reviewed journals.

Data Coding

Studies meeting the inclusion criteria were summarized in the following terms: (a) participant characteristics (number, age in years, and disability), (b) intervention procedures (treatment, target skills, device), (c) experimental design (design, quality indicators), and (d) outcomes. Studies were sorted into three categories: those using video prompting alone, video prompting with multiple viewings, and video prompting with error correction procedures (VP+ECP, see Table 1-Table 3).

Results

Eighteen studies (spanning 2005-2013) were reviewed and are presented in Table 1 through Table 3. Within each table studies are listed in alphabetical order by reference. The participant characteristics column includes the number of subjects, their age in years, and the severity of their intellectual disabilities. If participants were identified as having comorbid autism spectrum disorder it was included; however, other comorbid disabilities were not reported in the tables. The intervention procedure section contains three columns consisting of the treatment, target skills, and devices. The treatment column briefly describes the main components of the interventions (e.g., video prompting, static picture prompting and video modeling). Next, the experimental design section is divided into two columns containing the design and quality indicators. Finally, the outcomes column summarizes data as positive, mixed, or negative. Positive results were those in which all participants demonstrated mastery criterion on all dependent measures (an expected outcome). Mixed results indicate that participants improved on some but not all dependent measures or some participants improved on all dependent measures while others did not. Negative results indicate that none of the participants experienced expected outcomes.

Table 1. *Video Prompting (VP) Alone*

Reference	Participants Characteristics	Intervention Procedures			Experimental Design		Outcomes
		Treatment	Target Skills	Device	Design	Quality Indicators	
Bereznak, Ayres, Mechling, & Alexander (2012)	N=3 CA= 15-18 yrs Mild-to-Moderate ID[1] Autism	VP[2]	Cook noodles Wash clothes Make copies	iPhone®	Multiple probe across tasks/participants + follow up (no device)	R, M, TI[8]	VP effective for all participants, (Positive); SDVP[5] effective for 2 of 3 participants (Mixed); Maintenance probes collected for all participants after VP removed showed deterioration on 2 of 3 skills—return to criterion levels with reinstatement of prompting device
Cannella-Malone et al. (2006)	N=6 CA= 27-41yrs Mild-to-Moderate ID Autism	VP VM[3]	Set table	Portable computer	ATD[7] Multiple probe across participants	R	VP effective for all participants, VP more effective than VM (Positive); however, Ron was unable to reach 100% mastery criterion when VP replaced the VM condition
Goodson, Sigafoos, O'Reilly, Cannella & Lancioni (2007)	N= 4 CA= 33-36 yrs Moderate ID Autism	VP	Set table	Portable computer	Multiple baseline across participants	R	Effective for 1 participant w/ VP alone 3 of 4 participants required VP+ECP[6] to meet criterion (Mixed); ECP = 2nd viewing of video clip followed by trainer completing step (live modeling)

Table 1. *Video Prompting (VP) Alone*

Reference	Participants Characteristics	Intervention Procedures			Experimental Design		Outcomes
		Treatment	Target Skills	Device	Design	Quality Indicators	
Horn et al. (2008)	N= 3 CA= 17-29 yrs ID Autism	VP	Wash clothes	Laptop	Multiple baseline + follow up (did not report device use)	R, M, TI	Effective for 2 of 3 participants using VP alone, VP not effective for 1 participant until least-to-most prompting added (Mixed); Maintenance collected for 2 of 3 participants after 2 wks: 1 able to maintain 100% correct while the other participant showed slight deterioration with 80% correct step completion
Mechling & Gustafson (2008)	N=6 CA= 15-21yrs Mild-to-Moderate ID Autism	VP SPP	Cooking task	DVD player	AATD with baseline, follow-up + final treatment conditions	R, TI	VP effective for all participants, VP more effective than SPP (Positive)
Mechling & Gustafson (2009)	N=6 CA= 18-22yrs Moderate ID	VP SPP	Cooking task	DVD player	AATD with baseline, follow-up + final treatment conditions	R, TI	VP effective for all participants, VP more effective than SPP (Positive)

Table 1. *Video Prompting (VP) Alone*

Reference	Participants Characteristics	Intervention Procedures			Experimental Design		Outcomes
		Treatment	Target Skills	Device	Design	Quality Indicators	
Sigafoos et al. (2005)	N= 3 CA= 34-36 yrs Moderate ID Autism	VP	Microwave popcorn	Portable computer	Multiple probe across participants + follow up (no device)	R, M	VP effective for 2 of 3 participants, 1 participant responded slowly to VP increasing up to 80% correct then regressed & did not finish (Mixed); Maintenance assessed for 2 participants after VP removed 2, 6, 10 weeks showed slight deterioration (80-100%) of skills
Sigafoos et al. (2007)	N= 3 CA= 27-33 yrs Mild-to-Moderate ID Autism	VP Fading Sequence	Wash dishes	Portable computer	Multiple baseline across participants + maintenance check (no device)	R, M	VP effective for all participants (Positive); Maintenance after VP removed 1, 2, 3 months showed slight deterioration but stabilized at 80-90% with reinstatement of 1-chunk video clip

[1]ID = Intellectual Disability
[2]VP = Video Prompting
[3]VM = Video Modeling
[4]SPP = Static Picture Prompt
[5]SDVP = Self-Directed Video Prompt
[6]ECP = Error Correction Procedure
[7]ATD = Alternating Treatment Design
[8]Reliability (R), Social Validity (SV), Maintenance (M), Generalization (G), Treatment Integrity (TI)

Table 2. *Video Prompting (VP) With Multiple Viewings (Video or Picture Feedback)*

Reference	Participants Characteristics	Intervention Procedures			Experimental Design		Outcomes
		Treatment	Target Skills	Device	Design	Quality Indicators	
Graves, Collins, Schuster, & Kleinert (2005)	N= 3 CA= 16-20 yrs Moderate ID[1]	VP[2]	Macaroni & cheese Cook noodles Make PBJ sandwich	TV & VCR	Multiple probe across behaviors + maintenance at 2 weeks (no device)	R, M, TI[6]	Effective for all participants (Positive); All participants were able to maintain skills at 100% over time
Mechling, Gast, & Fields (2008)	N= 3 CA= 19-22 yrs Moderate ID	VP	Grilled cheese sandwich Microwave hamburger helper Make salad	DVD Player	Multiple probe across tasks + maintenance at 2 & 10 weeks (device)	R, M, TI	Effective for all participants (Positive); SDVP[4] effective for all but students continued to need instructor prompts to use skip feature (Sue required 0 to 3.6% prompts, Molly 1.8 to 5.8% & Jason 5.4 to 5.8%) (Positive); all participants able to maintain skills at 90-100% across skills at 2 & 10 weeks
Mechling, Gast, & Seid (2009)	N= 3 CA= 16-17 yrs Mild-to-Moderate ID Autism	VP	Microwave hamburger helper Grilled ham & cheese sandwich Make pizza	PDA	Multiple probe across Tasks + maintenance probes collected (no device)	R, SV, M, TI	Effective for all participants (Positive); SDVP effective for all participants (Positive); they self-adjusted prompt levels to less intrusive prompts (SPP[3]+audio); however, they continued to rely on prompts to use technology; Maintenance probes— able to maintain 100% correct responding (Positive)

Table 2. *Video Prompting (VP) With Multiple Viewings (Video or Picture Feedback)*

Reference	Participants Characteristics	Intervention Procedures			Experimental Design		Outcomes
		Treatment	Target Skills	Device	Design	Quality Indicators	
Mechling & Stephens (2009)	N=4 CA= 19-22 yrs Moderate ID Autism traits	VP SPP	Meal preparation	DVD Player SPP Book	[5]AATD with baseline, alternating treatments + final treatment conditions	R, SV, TI	VP more effective than SPP for all (3 of 4 showed 100% correct steps for set 1 task on final treatment (Positive); SDVP effective for all (Positive), but participants continued to make errors (VP mean= 2.5% & SPP mean= 4.9%)

[1]ID = Intellectual Disability
[2]VP = Video Prompting
[3]SPP = Static Picture Prompt
[4]SDVP = Self-Directed Video Prompt
[5]AATD = Adapted Alternating Treatment Design
[6]Reliability (R), Social Validity (SV), Maintenance (M), Generalization (G), Treatment Integrity (TI)

Table 3. *Video Prompting (VP) With Error Correction Procedures*

Reference	Participants Characteristics	Intervention Procedures			Experimental Design		Outcomes
		Treatment	Target Skills	Device	Design	Quality Indicators	
Cannella-Malone, Brooks, & Tullis (2013)	N=4 CA=15-17 yrs Moderate-to-Severe ID[1] PDD[2]	VP[3]+ECP[8] (at outset) iPod Touch® Training SDVP+ECP	Wash table Vacuuming	iPod Touch®	Multiple probe across participants design + maintenance (device) at 1-3 wks	R, SV, M*, TI[10]	VP+ECP effective for all (Positive); 3 of 4 participants moved to SDVP[7] and percent of prompts to use technology decreased over tasks; however, only 2 of 3 reached mastery criterion (Mixed); Maintenance using ECP showed 100% for both participants (Positive)
Cannella-Malone, Wheaton, Wu, Tullis, & Park (2012)	N= 3 CA= 15 yrs Moderate-to-Profound ID Autism	VP+ECP (at outset) VP In-Vivo	Sweeping Wash table	iPod Touch®	AATD[9] within a multiple probe across participants design	R, TI	2 of 3 participants VP+ECP at outset slightly more efficient than VP alone, but VP+ECP had little effect on Matt; he gained skills with addition of In-Vivo modeling; 2 of 3 participants required In-Vivo modeling to continue to progress (Mixed)
Johnson, Blood, Freeman, & Simmons (2013)	N= 2 CA= 17 yrs Moderate ID Autism Autism Traits	SDVP+ECP	Fruit smoothie Macaroni & cheese Micro Pizza	iPod Touch®	Multiple probe across behaviors design + maintenance probes (device) after meeting criterion on each task	R, SV, M, TI	SDVP+ECP effective for all (Positive) participants decreased dependence on prompts to use device over course of study (Positive); Maintenance showed 100% for all tasks & participants (Positive)

Table 3. *Video Prompting (VP) With Error Correction Procedures*

Reference	Participants Characteristics	Intervention Procedures			Experimental Design		Outcomes
		Treatment	Target Skills	Device	Design	Quality Indicators	
Payne, Cannella-Malone, Tullis, & Sabielny (2012)	N= 2 CA= 18-19 yrs Moderate-to-Severe ID Autism/PDD	VP SDVP	Microwave popcorn Noodle soup	iPod Touch®	Multiple probe across participants design	R, SV, TI	VP+ECP effective for all (Positive); 1 of 2 participants moved to SDVP made progress but performance was erratic & did not reach mastery criterion (Mixed)
Van Laarhoven, Johnson, Van Laarhoven-Myers, Grider K. L. & Grider, K. M. (2009)	N= 1 CA= 17yrs Moderate ID	VP VP+VFA[5] VP+VF+C[6]	Clean bathroom Mop floor Empty trash	iPod Touch®	Multiple probe across participants + follow up probe (no device)	R, SV, M, TI	VP effective for all participants (Positive); SDVP was effective, percent of prompts to use technology decreased over tasks from 10% to 2.5% (Positive); Maintenance probe after VP removed 10 weeks showed a slight deterioration then stabilized at 89%

Table 3. *Video Prompting (VP) With Error Correction Procedures*

Reference	Participants Characteristics	Intervention Procedures			Experimental Design		Outcomes
		Treatment	Target Skills	Device	Design	Quality Indicators	
Van Laarhoven, Kraus, Karpman, Nizzi, & Valentino (2010)	N= 2 CA= 13-14 yrs Mild-to-Moderate ID Autism	VP SPP[4]	Fold clothes Microwave pasta	Laptop Computer SPP Book	Within-subjects AATD counterbalanced skills across conditions and participants+maintenance (no device)	R, SV, M, G, TI	VP more effective & efficient than SPP for all participants (Positive); Steady decrease in prompts to use technology were needed for both participants (Gary VP= 7%, SPP=13% & Marvin VP=2%, SPP=7%) SDVP effective for all and result in reaching 85% mastery criterion (Positive); Maintenance collected for all participants after 1 and 6 weeks with 1 participant being able to maintain and generalize skills taught using both VP and SPP while other participant was only able to maintain skills taught using VP procedures (Positive)

[1]ID = Intellectual Disability
[2]PDD = Pervasive Developmental Disorder
[3]VP = Video Prompting
[4]SPP = Static Picture Prompt
[5]VFA = Video Feedback Alone
[6]VF+C = Video Feedback + Controlling prompt
[7]SDVP = Self-Directed Video Prompt
[8]ECP = Error Correction Procedure
[9]AATD = Adapted Alternating Treatment Design
[10]Reliability (R), Social Validity (SV), Maintenance (M), Generalization (G), Treatment Integrity (TI)
*Denotes maintenance was collected with researchers implementing error correction procedures for both device use and to teach target skill

Participant Characteristics

The 18 studies meeting inclusion criteria provided video prompting interventions to a total of 61 participants (50 males and 11 females). Twelve studies included 1 to 3 participants and three studies included 4 participants, while the remaining 2 studies included 6 participants. Participants ranged in age from 13 to 41 years. Fourteen studies included participants diagnosed with mild-to-moderate or moderate intellectual disability and three studies included participants identified with moderate-to-severe or moderate-to-profound intellectual disability, while only one study (Horn et al., 2008) did not indicate the severity level of the participants' intellectual disability. In addition to intellectual disability, 36 participants had a dual diagnosis of autism or autistic traits. Only three of the studies (Bereznak, Ayres, Mechling, & Alexander, 2012; Cannella-Malone, Brooks, & Tullis, 2013; Payne, Cannella-Malone, Tullis, & Sabielny, 2012) identified the ethnicity of the participants.

Intervention Procedures

Eight studies used video prompting alone (see Table 1), four studies employed video prompting plus additional viewings (see Table 2), while six studies utilized video prompting plus error correction procedures (see Table 3) to teach a variety of targeted independent living/vocational skills. The majority of studies targeted independent living skills (n=17) such as food preparation, putting away groceries, washing dishes, sweeping the floor, vacuuming, and completing laundry tasks; while only one study (Van Laarhoven, Zurita, Johnson, Grider, & Grider, 2009) targeted vocational skills such as cleaning a bathroom, mopping the floor, taking out the trash, and cleaning kennels.

A variety of materials and devices were used; however, the majority of the video prompts were presented on portable computers or handheld devices (iPod Touch®, iPhone®, etc.), while a minority of the studies (n=5) used older delivery systems, such as, a TV/VCR combination or DVD player. Nine studies reported training 24 participants (21 males and 3 females) to operate a prompting device. Ten studies reported that video

clips were prepared using a spectator's (n=5) or a participant's (n=5) viewpoint; however, a slight majority (n=6) reported using a combination of both viewpoints. Two studies failed to report the viewpoint of their respective intervention procedures (Mechling & Gustafson, 2008; Mechling & Gustafson, 2009). All studies reported using voice-over instructions (auditory prompting). Nine studies reported the length of the video clips which ranged from 4 to 42 seconds. Interventions were conducted in schools (n=9), vocational settings (n=1) and residential facilities (n=8).

Experimental Design and Outcomes

Variations of single-case design were used across all the studies and visual analysis was used to determine intervention efficacy. Specifically, multiple baseline or multiple probe across tasks/participants design was used in a majority of studies (n=12); while the remaining studies (n=6) employed variants of an alternating treatment design. The majority of studies (n=15) collected at least three data points during baseline, prior to moving into the intervention phase of their research; however, three studies (Horn et al., 2008; Johnson, Blood, Freeman, & Simmons, 2013; Van Laarhoven et al., 2009) did not. None of the 18 studies taught parents or caregivers to implement the video prompting intervention.

While only one study (Van Laarhoven, Kraus, Karpman, Nizzi, & Valention 2010) reported all five quality indicators, all studies (n=18) reported reliability data, thirteen studies report treatment integrity data, eleven reported maintenance data, seven reported social validity data, and one study reported generalization data.

The following section presents an overview of the interventions used and their outcomes across the eighteen reviewed studies. Specifically, to focus on the impact of video prompting, the intervention procedures were purposely organized into three categories based on the strategy employed: video prompting alone, video prompting with multiple viewings, and video prompting with error correction procedures (see Table 1

through Table 3). Each section includes the number of studies employing specific intervention components, salient participant characteristics, and outcomes.

Video Prompting Alone.

Of the 18 video prompting studies included in this synthesis, 44% (n=8) of the studies utilized video prompting alone (without any additional instructions, feedback, or prompts other than the one sentence voiceover instruction provided in the video clips) to teach target skills to 34 participants between the ages of 15 and 41 years. Five of the 8 studies reported participants having either a mild or moderate intellectual disability, two studies reported participants as having a moderate intellectual disability, one study reported participants as simply having an intellectual disability without mentioning the severity level, while none of the articles in this category included participants with either a severe or profound intellectual disability (see Table 1).

In these eight studies, video prompting was effective without additional prompts, corrections, or reinforcement for a majority of the participants. Outcomes from these studies indicate 85% (n=29) of the participants were able to acquire the target skills taught using video prompting alone. Five studies (Bereznak et al., 2012; Cannella-Malone et al., 2006; Mechling & Gustafson, 2008, 2009; Sigafoos et al., 2007) produced positive outcomes for VP alone; while, the remaining three studies (Goodson, Sigafoos, O'Reilly, Cannella, & Lancioni, 2007; Horn et al., 2008; Sigafoos et al., 2005) had mixed outcomes. One study (Bereznak et al., 2012) taught participants to self-operate their prompting devices with mixed outcomes. Specifically, 2 of 3 participants learned how to self-prompt with the iPhone® and taught themselves three target skills. In the three studies with mixed outcomes there were five participants who did not respond favorably to video prompting alone. One was dropped from the study for unrelated reasons, specifically the lack of interest in making or eating popcorn after the death of a family member (Sigafoos et al., 2005), three responded immediately to a two-step error correction procedure (ECP) of viewing the video prompting a second time followed by a

live demonstration if needed (Goodson et al., 2007), while the final participant was provided an ECP of least-to-most prompting hierarchy resulting in a gradual increase to 80% correct responding over eleven sessions (Horn et al., 2008). More specifically, Goodson et al. (2007) reported only one participant responded to video prompting alone, whereas 3 of 4 participants required the additional use of ECP before they were able to meet the mastery criterion. That is, they found that video prompting alone was not sufficient to ensure skill acquisition. Horn et al. (2008) reported similar, albeit slightly better results when using video prompting alone, finding it effective for 2 of 3 participants, while one participant responded only after implementation of a least-to-most prompt hierarchy.

Half of the studies (n=4) assessed maintenance data after video prompting had been removed. All of the studies reported deterioration of skills for all of their participants with the exception of Horn et al. (2008) which reported one participant was able to maintain 100% correct performance. Three studies (Bereznak et al., 2012; Sigafoos et al., 2005, 2007) reported stabilization to previous levels with the reinstatement of video prompting while the forth study (Horn et al., 2008) did not provide this data. None of the eight studies in this category measured either generalization or social validity.

None of the participants were shown to be able to independently operate the prompting devices from start to finish; however, these studies did not include an attempt to train them to do so. As a result, they continued to remain reliant on others in their environment.

Video Prompting With Multiple Viewings.

Of the 18 studies included in this synthesis, 22% (n=4) utilized video prompting with multiple viewings to teach a variety of independent living skills to 13 participants between the ages of 16 and 22 years. The majority of studies (n=3) reported participants having a moderate intellectual disability, one study reported participants having either a

mild or moderate intellectual disability, while none of the articles in this category included participants with either a severe or profound intellectual disability (see Table 2).

In these four studies, video prompting with multiple viewings was effective for 100% (n=13) of participants. All of the studies in this category produced positive outcomes for the video prompting procedures. Three studies (Mechling, Gast, & Fields, 2008; Mechling, Gast, & Seid, 2009; Mechling & Stephens, 2009) taught participants to operate their prompting device, ultimately teaching themselves a variety of independent living skills. While the data gleaned from these studies suggests mostly positive outcomes, it is important to note that participants in these studies continued to make errors while using the prompting devices and none of them were able to meet 100% correct performance across targeted skills. Although participants continued to rely upon their prompting devices, several began to self-fade to less intrusive prompt levels. None of the participants were shown to be able to independently operate the prompting devices from start to finish and the studies did not include an attempt to train them to do so. Therefore, they continued to be reliant on others in their environment.

Three-fourths of the studies (n=3) assessed maintenance data after video prompting had been removed. Two studies (Graves, Collins, Schuster, & Kleinert, 2005; Mechling et al., 2009) reported assessing maintenance data without the use of a prompting device, while Mechling et al. (2008) allowed participants to self-operate their prompting devices when collecting maintenance data. All of the studies reported deterioration of skills with the exception of Mechling et al. (2009) which reported their participants were able to maintain 100% correct performance during the maintenance probes collected without the use of a prompting device. None of the four studies in this category measured generalization data; however, two studies (Mechling et al., 2009; Mechling & Stephens, 2009) collected social validity data. Mechling et al. (2009) asked participants about their device preference when cooking, and two participants preferred the portable DVD player, while the third participant preferred the personal digital

assistant (PDA). Similarly, when Mechling & Stephens (2009) asked participants which intervention procedures they would like to use at home for cooking, the participants indicated a preference for video prompting over static picture prompting interventions. Social validity data was collected from participants, but school personnel and caregivers were not solicited for their opinions regarding either the ease or effectiveness of the interventions.

Video Prompting With Error Correction Procedures.

Of the 18 video prompting studies, 14 participants between the ages of 13 and 19 years old in 33% (n=6) of the studies were unable to successfully acquire independent living/vocational skills through the use of video prompting alone and required more intrusive error correction procedures. Of these six studies, only one study (Van Laarhoven et al., 2010) reported participants as diagnosed with either a mild or moderate intellectual disability, two studies (Johnson et al., 2013; Van Laarhoven et al., 2009) reported participants as having a moderate disability, while the remaining three studies reported participants as having either moderate-to-severe or moderate-to-profound intellectual disability. The studies included in the video prompting with error correction procedures category were the only ones that included participants with severe/profound intellectual disabilities.

In these six studies, video prompting plus error correction procedures were required to promote the acquisition of several independent living/vocational skills. Five of these studies examined the effectiveness of VP+ECP employing a least-to-most prompt hierarchy (Cannella-Malone et al., 2013; Cannella-Malone, Wheaton, Wu, Tullis, & Park, 2012; Johnson et al., 2013; Van Laarhoven et al., 2009; Van Laarhoven et al., 2010) while the sixth study examined the effectiveness of using VP+ECP employing a most-to-least prompt hierarchy (Payne, Cannella-Malone, Tullis, & Sabielny, 2012). All of the studies within this category produced positive outcomes for teaching transition age participants independent living/vocational skills using video prompting plus error

correction procedures with the exception of Cannella-Malone et al. (2012) which produced mixed results. Cannella-Malone et al. (2012) reported that 2 of 3 participants responded slightly more favorably to the VP+ECP at the outset than to video prompting alone. One participant with profound intellectual disability showed little response to either the video prompting alone or VP+ECP conditions. Ultimately, two participants required more intensive error correction procedures in the form of in-vivo modeling to continue to make progress. Five studies (Cannella-Malone et al., 2013; Johnson et al., 2013; Payne et al., 2012; Van Laarhoven et al., 2009; 2010) taught participants to self-operate their prompting devices with varying outcomes. Specifically, two studies (Cannella-Malone et al., 2013; Payne et al., 2012) reported mixed outcomes, while the remaining three studies were able to train participants to ultimately teach themselves several target skills thereby resulting in positive outcomes. Payne et al. (2012) reported needing to use VP+ECP to teach both participants to microwave popcorn; however, one participant (with severe intellectual disability) continued to demonstrate erratic performance and was unable to reach the mastery criterion to move to the next phase in the intervention, self-directed video prompting (SDVP). Similarly, Cannella-Malone et al. (2013) reported one participant was unable to meet criterion to move to the SDVP phase due to erratic performance, while the other participant (with moderate-to-severe intellectual disability and pervasive developmental disorder) moved into the SDVP phase but due to limited time only received three training sessions resulting in an average performance of 43% steps correct.

None of the participants except one (Van Laarhoven et al., 2009) were shown to be able to independently operate the prompting devices from start to finish; however, only Van Laarhoven et al. (2009) attempted to train them to do so. As a result, all but one participant continued to remain reliant on others in their environment.

Two-thirds of the studies (n=4) assessed maintenance data after video prompting had been removed. All of the studies reported positive outcomes for their maintenance

checks; however, it's important to note that two studies (Van Laarhoven et al., 2009; 2010) collected data with video prompting supports removed, while the other two studies (Cannella-Malone et al., 2013; Johnson et al., 2013) collected data with video prompting supports in place. Additionally, it should be noted that error correction procedures were implemented both for device use and target skill during the maintenance phase of the Cannella-Malone et al. (2013) study. Johnson et al. (2013) reported all participants were able to maintain 100% correct independent task performance with the use of the self-prompting device during maintenance probes collected shortly after criterion was met for each task. Whereas, Van Laarhoven et al. (2009) reported a slight deterioration in skills from 94% to 89% correct performance 10 weeks after training terminated for their participant. Similarly, Van Laarhoven et al. (2010) reported both participants in their study were not only able to maintain performance at a mastery criterion of 85% correct up to 6 weeks after training terminated, but were also able to generalize their skills to novel settings and materials. Only Van Laarhoven et al. (2010) collected generalization data; however, 83% (n=5) of the studies collected social validity data. Cannella-Malone et al. (2013) asked 3 of 4 participants four questions related to the social validity of the study and found that students wanted to learn more skills using the iPod Touch® as a self-prompting device. Van Laarhoven et al. (2009) interviewed a participant, his parents and his employer regarding the effectiveness of the video iPod as a prompting device and results indicated all were "extremely pleased" and viewed it as a beneficial tool. Similarly, Van Laarhoven et al. (2010) and Payne et al. (2012) asked students and staff their opinions about the importance of the intervention, perceived costs, effectiveness of specific interventions and possible barriers. Van Laarhoven et al. (2010) found that teachers viewed video prompting strategies to be the most effective and efficient teaching strategy; however, the same teachers state a preference for using the less efficient static picture prompting training method due in part to familiarity and portability. Contrary to findings of Van Laarhoven et al. (2010), Johnson et al. (2013) found that school

personnel support video prompting strategies, and view them as cost-effective, efficient and compatible to multiple demands during classroom instruction.

Discussion

This systematic review aimed to evaluate the use of video prompting strategies for transition age individuals with intellectual disabilities. A systematic search identified 18 studies meeting the inclusion criteria. The results of these studies were largely positive, suggesting that video prompting procedures are viable instructional strategies for teaching independent living skills to individuals with intellectual disabilities. The results of these studies also suggest that individuals with intellectual disabilities can be taught to operate a variety of technological aids (e.g., DVD players, PDA, iPod Touch®) for the acquisition of independent living and vocational skills. Evidence indicates that using technological aids as prompting tools successfully reduces the need for direct instruction from others, promotes flexibility in the provision of supports (e.g., multiple viewings, faded reliance upon device, etc.) and increases the degree of consistent instruction (Charlop-Christy, Le, & Freeman, 2000). More specifically, using video-based instruction decreases prompt dependence on others in the environment, who typically serve as a discriminative stimulus, by transferring stimulus control to the prompting device, thereby increasing independence.

While the results of this review suggest that video prompting interventions be considered an evidenced-based practice (EBP) for teaching independent living skills to transition age individuals with intellectual disabilities, this conclusion must be considered in light of the relatively small number of participants (n=29) with various degrees of intellectual disabilities who responded favorably to video prompting procedures without the need for additional instructional prompts or error correction procedures. Clear differences existed among participants' degree of functioning relative to the video prompting strategies required for them to successfully acquire targeted independent living/vocational skills. The majority of participants producing positive outcome in the

video prompting alone studies were reported to be higher functioning (mild-to-moderate ID); while those requiring the most intrusive instructional strategies (e.g., video prompting plus error correction procedures) were diagnosed with moderate-to-profound intellectual disabilities. This last observation, however, should not be taken that individuals with profound intellectual disabilities cannot profit from video prompting procedures, but rather that they may require more intensive training and support than their higher functioning peers.

Horner and colleagues (2005) highlighted the importance of reporting on quality indicators as a method of partially evaluating an intervention's empirical support as an evidenced-based practice. Although the reviewed studies met the minimum criterion to be considered an evidenced-based practice as outlined by Horner et al. (2005), most researchers failed to report all five quality indicators. Therefore, in the future, researchers should assess all quality indicators to lend credibility to their conclusions. To measure the long-term success of the intervention, researchers need to systematically assess maintenance (e.g., deterioration rate, fading procedure, etc) and generalization of skills. While removal of video prompting may be an ultimate goal for some individuals, this may not be a functionally relevant goal for individuals with severe cognitive limitations who may benefit from the continued support of using a prompting device in a competitive work environment. Results showed some participants began self-fading prompting supports (Cannella-Malone et al., 2013; Mechling et al., 2009; Van Laarhoven et al., 2009); however, only one study (Sigafoos et al., 2007) systematically examined fading procedures. Therefore, the need to further investigate techniques to reduce their reliance on prompting devices appears warranted. Additionally, to increase the chances of generalizing skills acquired through the use of video prompting to novel situations (environments, materials, people), researchers should systematically program for these goals in the intervention procedures to accommodate the variability found in the individual's natural environment, ultimately in an effort to transfer stimulus control to

natural cues (Mechling et al., 2008; Van Laarhoven et al., 2010). Finally, less than 40% (n=7) of the reviewed studies directly assessed social validity, and, when assessed, the majority (n=7) solicited the opinions of participants, while only a minority (n=4) requested feedback from parents, employers, school personnel, and participants. It is important that all researchers collect and report social validity data because it is a leading indicator of the likelihood that practitioners will sustain video prompting procedures with treatment fidelity. When social validity is low it is more likely the intervention procedures will be considered too cumbersome and labor intensive causing teachers, practitioners, and caregivers to prematurely discontinue the intervention prior to skill acquisition. Van Laarhoven et al. (2010) found support for this premise when school personnel stated that given the choice to implement video prompting (the more effective intervention procedure) or static picture prompting (the less effective intervention procedure), they would opt for using the less efficient teaching strategy due primarily to familiarity and perceived ease of portability. While data is limited, the research is beginning to support the social validity of teaching strategies employing video prompting, but until misperceptions (too costly, difficult, and time-consuming) about using this technology are addressed, barriers will remain that prevent its wide-spread implementation.

The development of appropriate independent living/vocational skills is pivotal to an individual's ability to function independently as an adult (Cannella-Malone et al., 2011; Van Laarhoven & Van Laarhoven-Myers, 2006). While some progress has been made in teaching a variety of independent living skills, only one study (6%) (Van Laarhoven et al., 2009) focused on teaching vocational skills. In light of Matson and colleagues (2009) findings of differential effects on overall functioning and adjustment for individuals with ID alone evincing more adaptive behaviors than those with ID plus ASD, researchers should extend the literature to investigate the effects of using video

prompting procedures across multiple vocational skills of varying task difficulty as well as idiosyncratic characteristics and abilities of individual participants.

An emerging trend in the video prompting literature is the training of participants to self-operate their prompting device. Though limited data is available now to support teaching individuals to acquire independent living/vocational skills through the use of self-directed video prompting (SDVP), researchers in 5 of the 9 studies reviewed used SDVP+ECP to teach the targeted skills. That is, of the four studies (Mechling et al., 2008, 2009; Mechling & Stephens, 2009) implementing SDVP without ECP only three studies produced positive outcomes for a total of 10 participants. Therefore, it cannot be determined if some or all of the components of this multi-element intervention package is responsible for the observed gains. As such, SDVP can not yet be considered an evidenced-based practice. Although all nine studies examining SDVP claimed to evaluate the participant's ability to acquire daily living/vocational skills independently, only one study (Van Laarhoven et al., 2009) required students to turn the device on, select the video from a playlist, select the skill sequence, select the menu item to pause the playlist, perform the task and then advance to the next screen. None of the teams taught the participants to charge the devices or retrieve them from their respective storage locations, so the participants continued to remain reliant on others. If individuals with moderate-to-severe disabilities are to increase self-determination and the ability to self-manage their behavior, researchers should include the training for all of the necessary skills to enable the person to independently complete 100% of the task from start to finish including device preparation and storing the device in its docking station after use.

Conclusion

While current literature appears to indicate positive outcomes for video prompting, caution should be used when attempting to generalize this data to populations beyond the scope of individuals participating in the original studies. Additional research is needed to determine if similar results can be replicated across a larger sample of

transition age students with severe disabilities (e.g., ID comorbid with ASD). More specifically, research is needed before these approaches can be viewed as evidenced-based practices for teaching individuals with moderate-to-severe intellectual disabilities. Researchers should continue to investigate the potential to further increase this population's ability to self-manage their behavior and acquire novel skills using self-directed video prompting. Assistive technology devices and self-management teaching strategies have the potential to increase the independence and vocational opportunities of this population who have historically been underrepresented in inclusive community settings. Therefore, research is needed to extend the video prompting literature by investigating the use of self-directed video prompting procedures (from start-to-finish) to increase the vocational skills to transition age students diagnosed with both autism spectrum disorder and intellectual disabilities.

CHAPTER 3

METHOD

The purpose of this chapter is to describe the method that was used to conduct the research. The current chapter has six aims: (1) to describe the setting and participant characteristics, (2) to identify the independent and dependent variables, (3) to identify the required materials, (4) to explain the research design and phase change criteria, (5) to explain data collection and researcher training, and (6) to detail experimental procedures, data recording and analysis procedures that were used.

The purpose of this project was to examine the effectiveness of video prompting strategies using a handheld device to increase the independent completion of a variety of vocational tasks among transition age students with autism spectrum disorder and intellectual disabilities. The research was conducted in a variety of locations within the participant's school. Prior to beginning this research project, the primary investigator obtained approval from the Institutional Review Board as well as the local special education director. Once permission was obtained, the primary investigator worked in collaboration with school personnel to identify potential candidates and secure consent/assent forms.

Participants and Settings

Participants

Four participants were selected from the available qualified candidates. To be eligible, participants must receive special education services as a student with a comorbid diagnosis of autism spectrum disorder and intellectual disabilities as outlined by criteria in the Diagnostic and Statistical Manual of Mental Disorders fifth edition (DSM-V, 2013) prior to the on-set of this research. The DSM-V stipulates that a person must exhibit the following characteristics which cause clinically significant impairment to be diagnosed with autism spectrum disorder: persistent deficits in social communication and interaction as well as restricted, repetitive patterns of behavior, interests, or activities. Individuals

previously diagnosed with autistic disorder, Asperger's disorder, or pervasive developmental disorder not otherwise specified utilizing the DSM-IV diagnostic criteria should be assigned the diagnosis of ASD (DSM-V, 2013). Additionally, the DSM-V (2013) states an intellectual disability exists when a person displays both intellectual and adaptive functioning deficits in conceptual, social, and practical domains with onset during the developmental period. Each candidate must also possess the following prerequisite skills to participate in the research: (a) the ability to watch a 20 second video clip, (b) the ability to demonstrate the necessary fine motor skills to independently operate an iPod Touch®, and (c) the ability to imitate a model. Table 4 provides a description of participant characteristics for individuals who were included in this research.

Table 4. *Psychometric Characteristics of Participants*

Participant	Age	Gender	Ethnicity	Disability	Full Scale IQ	Adaptive Composite
Kevin	20-10	Male	Caucasian	ASD; ID	59[a]	42[d]
Ted	15-4	Male	Caucasian	ID; ASD; SI	59[a]; 68[b]	76[d]
Mark	14-6	Male	Hispanic	ASD; ID: SI	60[a]	40[d]
Ed	18-4	Male	Hispanic	ASD; ID	64[a]	65[c]

[a]Woodcock Johnson Test of Cognitive Abilities—Third Edition; [b]Kaufman Assessment Battery for Children—Second; [c]Adaptive Behavior Evaluation Scale—Second Edition; [d]Adaptive Behavior Assessment System—Second Edition

Additionally, all of the participants qualified as economically disadvantaged for free/reduced lunches with females as the head of the household and they all had some experience using touch screen technology; however, they had no previous video-based instruction prior to this research.

Settings

The research was conducted with special education students from a local education agency located in the Southwestern United States. The special education department providing services to the research participants serves approximately 500 students within the region. All phases of this research took place in the participant's

school. The setting was chosen based on the logistics for teaching the employment skills and the phase of the research. Prior to intervention implementation each participant was taught to use the iPod Touch® in a designated room away from their classmates (see Appendix D). The designated training location for the intervention phase included necessary supplies such as a table, chairs, and the equipment used to complete the vocational task.

Tasks

The primary investigator, in collaboration with special education staff, developed a task analysis for five novel vocational tasks (see Appendix A) to be targeted for instruction. These tasks included (a) sorting mail, (b) folding pizza boxes, (c) making coffee, (d) photocopying and (e) setting a table. There was no significant overlap in skills across the targeted tasks.

Independent Variables

Self-Directed Video Prompting

After retrieving and turning on the iPod Touch®, participants selected and viewed video segments for each step of the skill sequence. After participants accessed video clips with voice-over narration they performed the steps viewed. Upon completion of the task, participants returned the iPod Touch® to the docking station to be charged.

Error Correction Procedures

As part of a two-step error correction procedure, participants were prompted to review the video clip (video feedback) if he failed to initiate a response within 5 seconds of the clip ending or if an error was made. If the participant made an error after a second viewing, the trainer provided a controlling prompt (modeling or physical prompt) to ensure correct performance before moving to the next step.

Dependent Variables

Percentage of Independent Correct Responses

The percentage of independent correct responses was calculated for each session using the formula (Van Laarhoven et al., 2009):

$$\text{Percentage of Independent Correct Responses} = \frac{\text{\# of Steps with Correct Responding}}{\text{\# of Total Steps}} \times 100$$

Participants were expected to complete baseline and pre-generalization sessions without viewing the video sequences.

Percentage of Two-Level Error Correction Prompts

The participants were assessed on the number of two-level error correction prompts (video feedback plus controlling prompt) required to complete the skill sequence. The percentage of two-level error correction prompts (ECP) were calculated for each session using the formula (Van Laarhoven et al., 2009):

$$\text{Percentage of ECP with Video Feedback} = \frac{\text{\# of Video Feedback Prompts}}{\text{\# of Total Steps}} \times 100$$

$$\text{Percentage of ECP with Controlling Prompts} = \frac{\text{\# of Controlling Prompts}}{\text{\# of Total Steps}} \times 100$$

Percentage of Prompts to Use Technology

The percentage of prompts to use technology was calculated for each session using the formula (Van Laarhoven et al., 2009):

$$\text{Percentage of Prompts to Use Technology} = \frac{\text{\# of Prompts to Use Technology}}{\text{\# of Total Steps} \times 2} \times 100$$

Participants were expected to complete baseline sessions without viewing the video sequences; therefore, no prompts to use technology were delivered during these sessions. Maintenance (follow-up) and post-generalization sessions used the same procedures as the intervention sessions.

Instructional Materials

Devices

The handheld device used as the video prompting tool for this research was the 5th-Generation 32-GB iPod Touch®. The iPod Touch® is an Apple product that incorporates a variety of features into a single widely accessible and affordable device. The device is approximately 4.86-by-2.31 inches and weighs roughly 3 ounces. The viewing area for the iPod Touch® is 4 inches diagonal with a 1136-by-640-pixel resolution at 326 pixels per inch.

Video files were created using an iPod® and video clips were uploaded directly into the Functional Planning System application.

Application Software

The Functional Planning System version 1.6, a video-based prompting software application by the Conover Company was installed on the iPod Touch®. This software is a commercially available customizable application which allows participants to view individual steps of a task with audio cues and can be used as a fading tool by combining specific steps or prompts as the user becomes proficient in completing steps of the task.

Research Design and Phase Change Criteria

Research Design

A multiple probe across tasks design replicated across participants was used to examine the efficacy of the intervention procedure on independent responding, and the percentage of error correction and technology prompts was calculated (Kennedy, 2005; Van Laarhoven et al., 2009). A staggered or time-lagged application of a treatment variable across different behaviors was implemented for each participant. Once the mastery criterion (90% accuracy across 3 consecutive sessions) was met and the SDVP intervention removed, generalization was assessed. Approximately 1, 2, 4 and 10 weeks after the participant met the mastery criterion and the SDVP intervention had been

removed a follow-up probe was conducted using the iPod Touch® to evaluate the maintenance of skill acquisition.

Phase Change Criteria

The multiple probe design is an efficient experimental design that minimizes data collection and scoring. It uses intermittent measures or probes to provide the basis for determining if a behavior change has occurred prior to the implementation of the intervention (Cooper et al., 2007). Using the multiple probe technique, the participant's level of performance was collected at baseline and intervention for each tier of the multiple probe design (Kennedy, 2005). Baseline data was collected for a minimum of three data points or until data was visibly stable (trend and level), then the intervention was subsequently implemented for each task until the participant reached mastery criterion. Probe data was collected prior to the implementation of the intervention at each tier. Once the participants reached mastery on targeted behaviors, maintenance (follow-up) and generalization probes were conducted.

Data Collection and Researcher Training

Data Collection

During baseline, intervention (including device preparation), maintenance (follow-up) and generalization phases, the primary investigator used event recording with task analysis to collect data on correct/incorrect responses for each step of the skill sequence (see Appendix B). Data was collected during the intervention phase for error correction procedures and for prompts to use technology (the iPod Touch®).

Researcher Training

Prior to beginning the research, all investigators completed the human subjects training modules through the University of Texas at Austin Office of Research Support website located at http://www.utexas.edu/research/rsc/humansubjects/training/index.html. All co-investigators were trained by the primary investigator on the intervention and data

collection procedures. Training continued until they were able to achieve scores of 90% agreement or greater for three consecutive sessions.

Experimental Procedures

Experimental procedures consist of the following phases: baseline, device training, intervention, maintenance (follow-up) and generalization. At the end of each session non-specific verbal praise was given to participants.

Baseline

Baseline data was collected prior to the implementation of the intervention. The participant was brought to the training location. The participant was observed engaging in target skills without access to the prompting device (iPod Touch®) or any other instructions. The participant was given an opportunity to independently attempt the task. If there was no attempt within 5 seconds of S^D or an error was made in the skill sequence, the trainer blocked the participant's view and completed the step. To ensure the participant was able to attempt each step of the target behavior, a multiple opportunity method was employed during the baseline phase; however, the participant received credit only for steps completed independently and correctly (without trainer prompts). This was done to provide a conservative estimate of the participant's knowledge of the target skill. Therefore, the trainer recorded a "-" for that step, and then instructed the participant to continue with the task (see Appendix C). This procedure was followed for all three tasks until they were completed. No controlling prompts were delivered.

Device Training

During this phase, a model-lead-test format was used (Van Laarhoven et al., 2009). The trainer modeled how to obtain the iPod Touch® from its docking station, turn on the device, navigate to the correct skill sequence in the video playlist, advance to the next clip or replay the current clip, complete the training task, go back to the home screen and return the device to its docking station to be charged (see Appendix D). Next, the

trainer led the participant through device use, providing verbal, gestural, modeling or physical prompts as needed.

Training trials were implemented in the participant's classroom setting away from classmates until the participant independently performed the task using the iPod Touch® (without trainer prompts) and completed the task sequence with 100% accuracy across 3 consecutive sessions.

Intervention

SDVP training sessions occurred no more than one per day and each lasted approximately 20 minutes. Participants were trained at school where the intervention session was intended to occur. The specific setting was dependent on each participant's identified needs and goals.

The participant was given the S^D, "Use the iPod to [Task Name]". Then he was required to independently retrieve the prompting device, turn the device on, locate the specific video clip, and view the video clip, etcetera, until the task was completed. If the participant required an error correction procedure after viewing the video clip, the trainer employed a two-level least-to-most prompt hierarchy consisting first of a reminder to review the video clip (video feedback) followed by a controlling prompt (model or physical prompt) if needed to correctly complete the step within the skill sequence (Van Laarhoven et al., 2009).

If the participant required technology prompts during device preparation the trainer provided a gestural or verbal prompt to properly use the device and recorded a "TP_1" for that step. If the prompt was insufficient to produce correct responding, the trainer provided a controlling prompt (modeling or physical prompt) to ensure correct completion and record a "TP_2" for that step. This process continued through each device preparation step until the participant was prepared to view the first video clip.

If the participant completed a step correctly without the iPod Touch® the trainer marked a "+" for that step; however, the trainer prompted the participant to use the

technology to move to the next appropriate step. If a step was completed correctly using the device without trainer prompts, the trainer annotated a "+I" for that step. If the participant watched the video clip again (self-correction) and performed the step correctly without prompting from the trainer, the trainer would annotate a "+" for that step. If the participant failed to initiate a response within 5 seconds after watching the video clip or made an error, the trainer pointed to the iPod Touch® and verbally prompted the participant to review the video clip again. If the participant correctly completed the task after the second viewing, the trainer recorded a "+VF". If the first prompt in the two-level prompting hierarchy did not produce a correct response, the trainer provided a controlling prompt (model or physical prompt) to ensure correct responding and a "-CP" was recorded (see Appendix E). If any ECP was used (even if it resulted in correct performance) the trainer annotated the error and did not give credit for that step. This process was repeated until all steps within the specific task analysis were completed. Data from each session was graphed enabling the primary investigator to determine the next step and if experimental control had been established.

Maintenance

Maintenance (follow-up) probes were conducted approximately 1, 2, 4 and 10 weeks after the participant met the mastery criterion for the specific task and training had been terminated (see Appendix E). Maintenance (follow-up) was defined as the participant maintaining the skill of using the iPod Touch® at 90% accuracy or above to independently complete the vocational task. Procedures were identical to those used during the intervention phase (see Appendix E).

Generalization

Pre-intervention generalization probes were assessed at the same time baseline data was collected using identical procedures. Post-intervention generalization probes were conducted after the participant completed the final maintenance probe for the SDVP intervention. Pre-generalization and post-generalization probes were identical to those

used during the baseline phase. These probes were assessed using novel material/equipment in novel environments to determine if the participant was able to transfer newly acquired skills to untrained settings and materials. According to Stokes and Baer (1977), generalization can be claimed when the participant performs the desired behavior under different or non-trained conditions without the use of the same conditions as had been used during the training or intervention phase (e.g., error correction procedures).

Data Recording and Analysis

Experimental control was determined through visual analysis, specifically when the data showed a consistent change in the level and/or trend from baseline to intervention phase with a simultaneous lack of change in untreated behaviors (Kennedy, 2005).

Interobserver Agreement

Reliability was collected on a minimum of 20% of baseline and intervention sessions (with at least one session in each condition for each participant). The primary investigator and two other observers collected data (in vivo or viewed video recordings of the sessions) to be assessed for interobserver agreement (IOA) and independently recorded data on the targeted behaviors. The percentage agreement index was used to calculate IOA. The formula for calculating the percentage agreement index was (Van Laarhoven et al., 2009):

$$\text{Percentage of Agreement Index} = \frac{\text{\# of Agreements}}{\text{Agreements + Disagreements}} \times 100$$

Procedural Integrity

High procedural integrity (≥80%) is required to interpret data with confidence; therefore, the primary investigator created a data collection form to measure the extent to which the independent variables were implemented as planned (Cooper et al., 2007). The

following data was collected: (a) was the correct video shown, (b) were the appropriate materials available, (c) were the prompts to use technology implemented correctly, and (d) was the correct error correction procedure followed (see Appendix B). Procedural integrity was assessed by the primary investigator and a second observer for at least 20% of the intervention sessions for each participant.

Social Validity

Social validity was assessed to determine critical stakeholders' opinions regarding the intervention's importance, perceived effectiveness, appropriateness, ease of use, and the desirability of using the intervention in the future (Cooper et al., 2007). Informal interviews were conducted using a survey with both teachers and the participants following the termination of the intervention. Teacher's perceptions were measured on a five-point Likert-type scale from strongly disagree to strongly agree; whereas, participant's perceptions were measured on a three-point scale (see Appendix F).

CHAPTER 4

RESULTS

This chapter presents the results of four participants with autism spectrum disorder and mild intellectual disabilities being instructed on how to independently operate an Apple iPod Touch® with the Functional Planning System application as a prompting tool to learn vocational tasks (see Table 5). A multiple probe across tasks design replicated across participants was used to determine the effectiveness of a self-directed video prompting intervention to increase independence on an assortment of vocational tasks and to determine if participants and teachers rated the prompting device a suitable tool and self-directed video prompting an effective intervention.

Table 5. *Task Assignments*

Name	Task 1	Task 2	Task 3
Kevin	Make Photocopies	Set Table*	Fold Pizza Boxes
Ted	Sort Mail	Make Coffee*	Fold Pizza Boxes
Mark	Sort Mail	Fold Pizza Boxes	Make Coffee*
Ed	Sort Mail	Make Coffee*	Fold Pizza Boxes

Note. Generalization task denoted by asterisks*

Figures 1, 2, 3, and 4 graphically present each participant's performance across baseline, intervention, maintenance (follow-up) and generalization phases. Finally, interobserver agreement, procedural reliability, and social validity outcomes are presented.

The results of this research showed that all participants were able to learn how to independently operate and use the iPod Touch® to learn a variety of vocational skills. All of the participants required prompts to use technology at least once during the intervention phase (see Table 6-9). Additionally, all participants were able to acquire novel vocational skills by either the SDVP alone or with the addition of video feedback. In fact, several of the participants in the current research began self-correcting by

watching the video clips again once they realized they could without penalty from the trainer. No additional error correction procedure was required to learn the vocational tasks.

Participant Data

Kevin

Figure 1 graphically presents the results for Kevin across three tasks (make photocopies, set table, and fold pizza boxes) and one generalization task (set table) while Table 6 numerically presents the percent of steps completed independently, percent of steps with error correction and the percent of prompts to use technology. During the baseline phase, Kevin completed up to two (20%) steps correctly during the photocopying task, up to five (50%) steps correctly during the table setting task and up to three (30%) steps correctly during the pizza box folding task; however, all tasks stabilized at 20% correct prior to the intervention being implemented. A pre-intervention generalization probe was collected during the baseline phase for the table setting task. Kevin met the mastery criterion (i.e., three consecutive sessions with 90% correct or higher) for all three tasks within the first three intervention sessions with zero overlap between the baseline and intervention phase data points. More specifically, when the SDVP intervention was introduced, Kevin showed an immediate and substantial increase in the percentage of steps performed correctly during baseline and reached 100% within two sessions for the photocopying task (top panel) and within one session for the table setting (center panel) and pizza box folding (lower panel) tasks (an increase of 80% from the probe session for both tasks). During the follow-up at 1, 2, 4, and 10-weeks, Kevin continued to maintain 90-100% performance on the photocopying task and 100% for the

pizza box folding task. Kevin was not assessed at 1 week for the table setting task; however, he maintained 100% performance at 2, 4, and 10-week follow-up and was able to generalize this skill to a novel setting and materials (see Figure 1). Kevin required the most amount of prompting to use technology when compared to the other participants (see Table 6).

Table 6. *Percentage of steps completed independently, percentage of steps with error correction prompts, and percentage of prompts to use technology during intervention sessions*

Tasks	Session	Percent of steps with independent correct responding (%)	Percentage steps with video feedback alone (%)	Percentage steps with 2-level prompting hierarchy (%)	Percentage prompts to use technology (%)
Make	5	90	10	0	0
Photocopies	6	100	0	0	0
	7	100	0	0	0
	8	100	0	0	2.04
	Mean	97.5	2.5	0	0.51
Set Table	9	100	0	0	0
	10	100	0	0	0
	11	100	0	0	3.06
	Mean	100	0	0	1.02
Fold Pizza	12	100	0	0	0
Boxes	13	100	0	0	2.04
	14	100	0	0	0
	Mean	100	0	0	0.68

(See chapter 3 for statistical formulas)

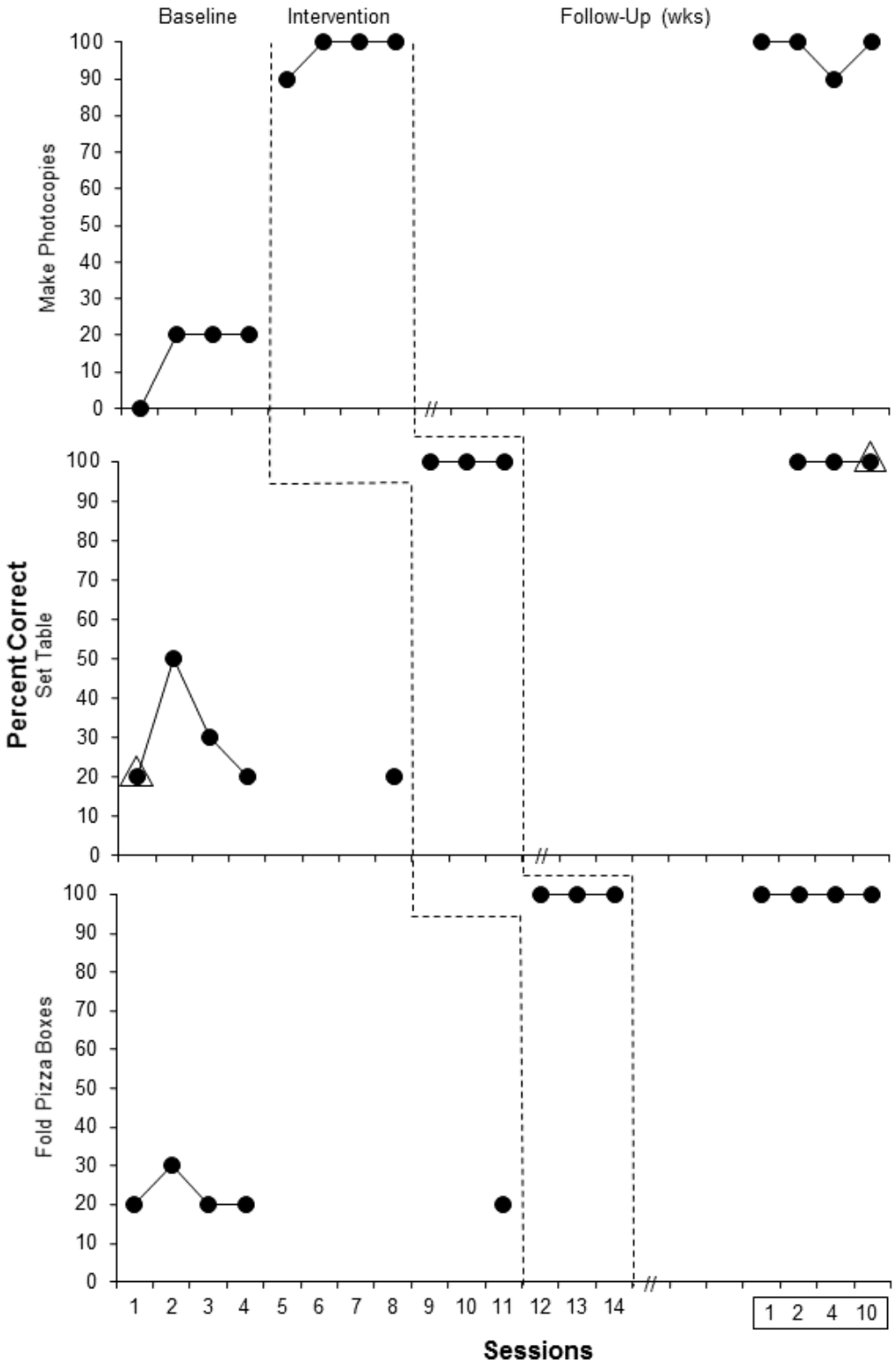

Figure 1. Percentage of independent correct responses for Kevin. The circles represent data collection for baseline, intervention and follow-up, while the triangle represents a pre-intervention generalization probe.

Ted

Figure 2 graphically presents the results for Ted across three tasks (sort mail, make coffee, and fold pizza boxes) and one generalization task while Table 7 numerically presents the percent of steps completed independently, percent of steps with error correction and the percent of prompts to use technology. During the baseline phase, Ted completed up to four (40%) steps correctly during the mail sorting task, up to two (20%) steps correctly during the coffee making task and zero (0%) steps correctly during the pizza box folding task; however, all tasks stabilized at 0-10% correct prior to the intervention being implemented. A pre-intervention generalization probe was collected during the baseline phase for the coffee making task. Ted met the mastery criterion for all three tasks within the first three intervention sessions. More specifically, the introduction of the SDVP intervention was associated with a marked change in level from baseline to intervention phases for all three tasks with zero overlap between the baseline and intervention phase data points. The mail sorting task (top panel) rose from a score of 0% correct responding just prior to the introduction of the SDVP intervention to 100% independent correct responding on the first session. Similar findings were replicated in the remaining two tasks as noted by an 80% increase during the first two sessions of the coffee making task (center panel) and a 100% improvement during the first two sessions of the pizza box folding task (lower panel). During the follow-up at 2, 4, and 10-weeks, Ted continued to maintain 100% performance on the mail sorting task, while his performance dropped slightly to 90% during the 4-week probe and then recovered during the 10-week probe for the coffee making task. Ted was assessed at 2 and 4-weeks after the last intervention session for the pizza box folding task and there was a slight decrease

in performance; however he continued to achieve 90% correct independent responding. Ted was able to generalize his coffee making skills acquired through the SDVP intervention to a novel setting and materials (see Figure 2). Ted required prompting to use technology only once (during the mail sorting task) throughout the entire intervention (see Table 7).

Table 7. *Percentage of steps completed independently, percentage of steps with error correction prompts, and percentage of prompts to use technology during intervention sessions*

Tasks	Session	Percent of steps with independent correct responding (%)	Percentage steps with video feedback alone (%)	Percentage steps with 2-level prompting hierarchy (%)	Percentage prompts to use technology (%)
Sort Mail	5	100	0	0	1.02
	6	100	0	0	0
	7	100	0	0	0
	Mean	100	0	0	0.34
Make Coffee	8	90	10	0	0
	9	90	10	0	0
	10	100	0	0	0
	Mean	93.3	6.7	0	0
Fold Pizza	11	100	0	0	0
Boxes	12	100	0	0	0
	13	90	10	0	0
	14	100	0	0	0
	Mean	97.5	2.5	0	0

(See chapter 3 for statistical formulas)

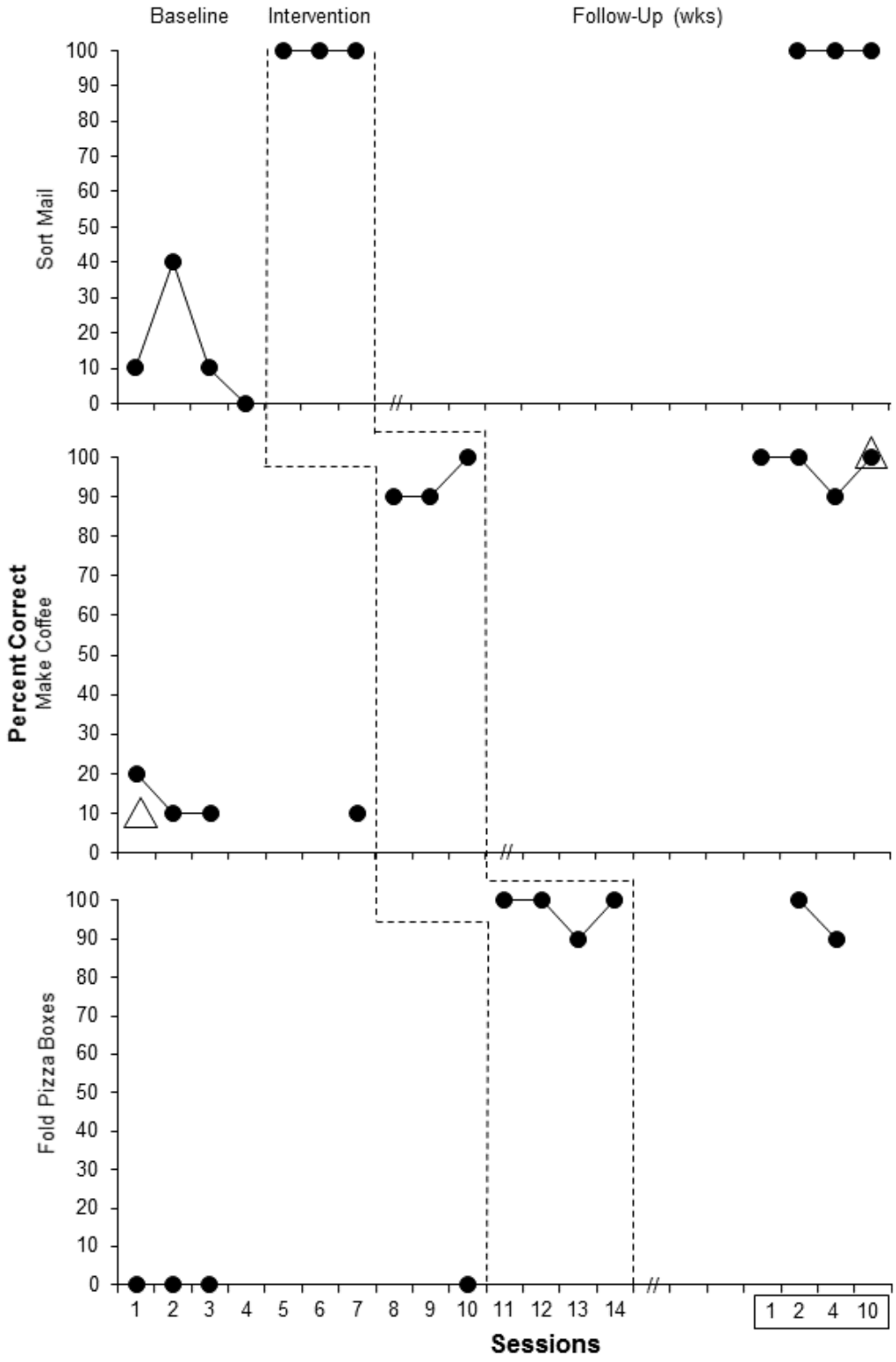

Figure 2. Percentage of independent correct responses for Ted. The circles represent data collection for baseline, intervention and follow-up, while the triangle represents a pre-intervention generalization probe.

Mark

Figure 3 graphically presents the results for Mark across three tasks (sort mail, fold pizza boxes, and make coffee) and one generalization probe, while Table 8 numerically presents the percent of steps completed independently, percent of steps with error correction and the percent of prompts to use technology. During the baseline phase, Mark completed up to five (50%) steps correctly during the mail sorting task, up to three (30%) steps correctly during the pizza folding task and up to three (30%) steps correctly during the coffee making task; however, all tasks stabilized at 20-30% completed correctly prior to the intervention being implemented. A pre-intervention generalization probe was collected during the baseline phase for the coffee making task; however, due to a lack of time (i.e., end of the school year) a post-generalization probe was not conducted. Mark met the mastery criterion on all three tasks within five intervention sessions. More specifically, when the SDVP intervention was introduced, Mark showed an immediate and substantial increase in the percentage of steps performed correctly during the baseline phase and reached 100% within one session for the mail sorting task (top panel), while it took him a little longer to reach 100% for both the pizza box folding and coffee making tasks (center and lower panels). More specifically, Mark met mastery criterion within four sessions for the pizza box folding task and within five sessions for the coffee making task with zero overlap between the baseline and intervention phase data points. During the follow-up at 2 and 4-weeks, Mark continued to maintain 100% performance on the mail sorting task. During the follow-up at 1, 2, and 4-weeks, he maintained 100% performance for the pizza box folding task but his percentage of steps completed independently ranged from 90 to 100% for the coffee making task (see Figure 3). Mark required the most amount of prompting to use technology for the mail sorting

task but required no prompting to use technology for the coffee making task (see Table 8).

Table 8. *Percentage of steps completed independently, percentage of steps with error correction prompts, and percentage of prompts to use technology during intervention sessions*

Tasks	Session	Percent of steps with independent correct responding (%)	Percentage steps with video feedback alone (%)	Percentage steps with 2-level prompting hierarchy (%)	Percentage prompts to use technology (%)
Sort Mail	5	100	0	0	0
	6	100	0	0	2.04
	7	100	0	0	2.04
	Mean	100	0	0	1.36
Fold Pizza	8	70	30	0	2.04
Boxes	9	90	10	0	0
	10	100	0	0	0
	11	100	0	0	0
	Mean	90	10	0	0.51
Make Coffee	12	100	0	0	0
	13	80	20	0	0
	14	90	10	0	0
	15	90	10	0	0
	16	100	0	0	0
	Mean	92	8	0	0

(See chapter 3 for statistical formulas)

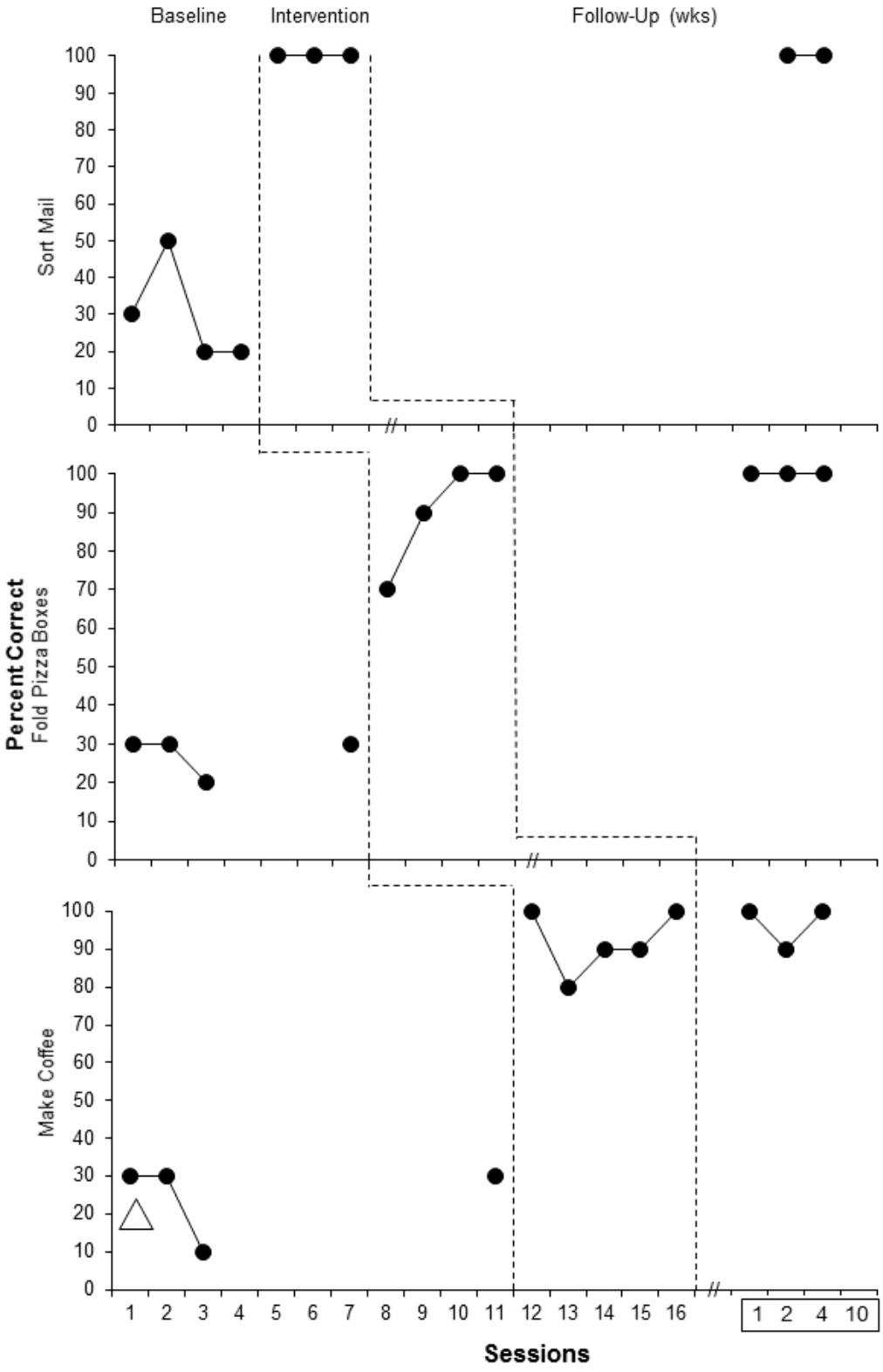

Figure 3. Percentage of independent correct responses for Mark. The circles represent data collection for baseline, intervention and follow-up, while the triangle represents a pre-intervention generalization probe.

Ed

Figure 4 graphically presents the results for Ed across three tasks (sort mail, make coffee, and fold pizza boxes) and one generalization probe, while Table 9 numerically presents the percent of steps completed independently, percent of steps with error correction and the percent of prompts to use technology. During the baseline phase, Ed completed zero (0%) steps correctly for all three vocational tasks prior to the intervention being implemented. A pre-intervention generalization probe was collected during the baseline phase for the coffee making task; however, due to a lack of time (i.e., end of the school year) a post-generalization probe was not conducted. Ed met the mastery criterion on all three tasks within three intervention sessions. More specifically, when the SDVP intervention was introduced, Ed showed an immediate and substantial increase over the percentage of steps performed correctly during baseline and reached 100% within one session for the mail sorting task (top panel) and the coffee making task (center panel), while it took him two sessions to reach 100% for the pizza box folding task (lower panel). More specifically, Ed met mastery criterion within three sessions for the tasks with zero overlap between the baseline and intervention phase data points. During the follow-up at 2, 4, and 10-weeks, Ed continued to maintain 100% performance on the mail sorting task. However, during the follow-up at 1, 2, and 4-weeks, his performance for the coffee making task ranged from 90-100%, while he continued to maintain 100% correct independent step completion for the pizza box folding task (see Figure 4). Ed required minimal amounts of prompting (one session during the coffee making task) to use technology throughout this research (see Table 9).

Table 9. *Percentage of steps completed independently, percentage of steps with error correction prompts, and percentage of prompts to use technology during intervention sessions*

Tasks	Session	Percent of steps with independent correct responding (%)	Percentage steps with video feedback alone (%)	Percentage steps with 2-level prompting hierarchy (%)	Percentage prompts to use technology (%)
Sort Mail	5	100	0	0	0
	6	100	0	0	0
	7	100	0	0	0
	Mean	100	0	0	0
Make Coffee	8	100	0	0	1.02
	9	100	0	0	0
	10	100	0	0	0
	Mean	100	0	0	0.34
Fold Pizza	11	90	10	0	0
Boxes	12	100	0	0	0
	13	100	0	0	0
	Mean	96.7	3.3	0	0

(See chapter 3 for statistical formulas)

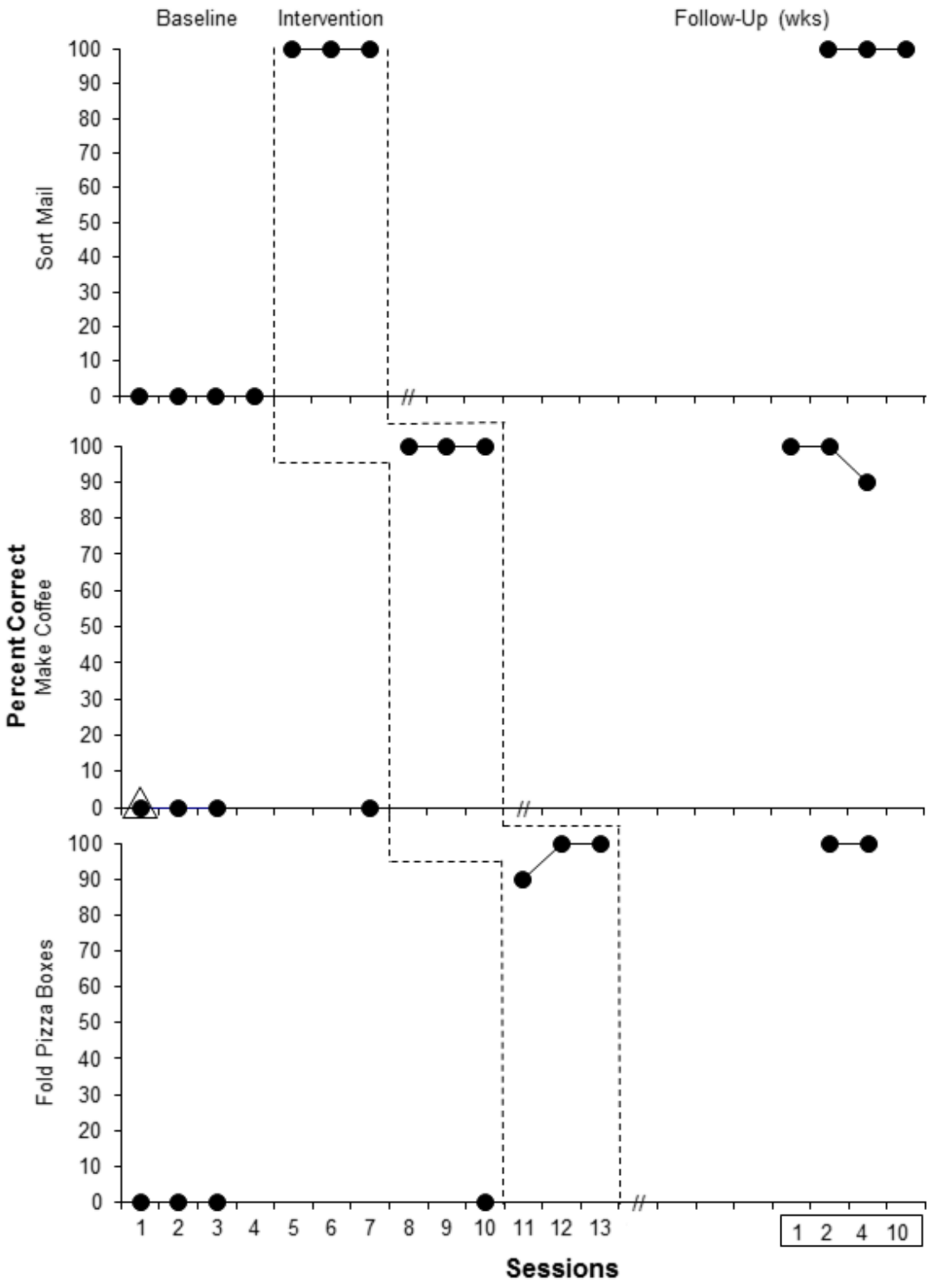

Figure 4. Percentage of independent correct responses for Ed. The circles represent data collection for baseline, intervention and follow-up, while the triangle represents a pre-intervention generalization probe.

Quality Indicators

Reliability

Reliability data was collected on 68% of all sessions (i.e., 25 out of 37) for Kevin, 64% of all sessions (i.e., 21 out of 33) for Ted, 67% of all sessions (i.e., 22 out of 33) for Mark, and 77% of all sessions (i.e., 23 out of 30) for Ed. The percentage agreement index (i.e., number of agreements divided by number of agreements plus disagreements and multiplied by 100) was used to calculate interobserver agreement (Kennedy, 2005). Interobserver agreement across sessions and participants resulted in a mean score of 100% (collected by two graduate students and the primary investigator).

Procedural Fidelity

In addition to collecting reliability data on dependent measures, the secondary observers collected data on the extent to which the intervention was implemented as planned. More specifically, the following measures were assessed: (a) was the device properly charged and housed in the docking stations prior to the S^D being issued, (b) were all necessary training materials available, (c) were the correct record forms used to collect data, (d) was the correct video used by the participants, (e) was the correct S^D issued, (f) did the trainer implemented the correct technology prompt as needed, and (g) were the correct error correction procedures issued appropriately. Procedural fidelity was calculated by dividing the number of correct measures by total number of assessed variables and multiplying by 100. Procedural fidelity was collected on 68% of all sessions (i.e., 25 out of 37) for Kevin, 64% of all sessions (i.e., 21 out of 33) for Ted, 67% of all sessions (i.e., 22 out of 33) for Mark, and 77% of all sessions (i.e., 23 out of

30) for Ed. Overall procedural fidelity for all phases assessed for Kevin, Ted, and Mark averaged 100%, while for Ed it averaged 99.8% (due to one error in implementing ECP).

Social Validity

Prior to the conclusion of the research all four participants were asked several questions pertaining to the use of the iPod Touch® and the SDVP intervention (see Appendix F). All four participants were asked to rank their answers from one to three (*1 = yes, 2 = maybe, and 3 = no*) across five questions and the mean social validity rating was 1.05 (ranging from 1.0 to 1.2). All four participants unanimously agreed the iPod Touch® with the FPS application helped them learn new job skills and work independently, enjoyed learning with the device, and felt their friends would like to use the device to learn new job skills. Ed was the only participant who reported "maybe" he would like to learn new skills using the iPod Touch® in the future, whereas the other three participants stated, "yes" when asked about using the intervention to learn in the future. Kevin made the following statements about his experience using the iPod Touch® and FPS application during this research, "I really like using it because it had all the steps and was fun and easy. I wish I had my own iPod Touch® for home and the job site." Ted stated, "I think the iPod was easy to learn," while Mark stated, "Using the iPod to make coffee was the best and it made teachers feeling [*sic*] happy." The participants' responses indicate an overall satisfaction with the intervention and a desire to continue using the procedures to learn new skills.

Prior to the conclusion of the research four special education teachers were asked several questions pertaining to the use of the iPod Touch® and the SDVP intervention (see Appendix F). All four teachers were asked to rank their answers on a scale from one

to five (*1 = strongly disagree to 5 = strongly agree*) across seven questions and the mean social validity rating was 5.0. All four teachers unanimously agreed the SDVP intervention was easy to implement, taught their student new vocational skills, increased their student's independence, was beneficial, and they would continue to use it in the future as well as recommend it to colleagues. Additionally, they all indicated that their students seemed to enjoy learning new skills with the SDVP intervention. One of Kevin's teachers stated, "At first I though maybe it would be difficult for him to grasp but he was so attentive and willing to respond to this intervention. It would be a great educational tool for the teacher and a huge boost of pride for the student because of his success." Another special education teacher stated, "I was worried about this working when we first began and seeing where the student was at. It was great to see him go through the process and become more independent. I can't wait to implement this intervention in my classroom next year with all my students. This is awesome, learning independently!" The educators' responses indicate an overall satisfaction with the intervention and a desire to implement the SDVP intervention with more students in the future. Given the primary investigator used equipment readily available at the school and the Functional Planning System application can be downloaded from the Apple App store, it appears that the SDVP intervention is affordable as well as effective.

Summary of Results

Results reveal that the SDVP intervention was beneficial for all participants and procedural fidelity data corroborates the integrity with which the intervention was implemented. More specifically, to determine if video prompting alone was sufficient for the acquisition of a novel skill, a comparison between the baseline and intervention phase

was made (see Table 10). When the means of each phase were compared, there was a substantial difference in the percentage of independent correct responding. Kevin showed an increase of 72% for the table setting tasks and an increase of 78% for the pizza box folding task without the use of ECP. Ted was able to acquire novel skills (mail sorting) via SDVP without the need of ECP showing an increase of 85% from baseline to interventions. Mark showed a similar pattern of learning (an increase of 70% from baseline to intervention). Ed showed an increase of 100% for both the mail sorting and coffee making tasks without the need of ECP to learn these skills. Therefore, all four participants were able to acquire at least one set of novel vocational skills using SDVP alone, while two of the four participants were able to acquire two out of three tasks without the use of ECP (see Table 10). When ECP was required, video feedback alone was the only procedure necessary to remediate the participants' performance; thereby enabling every participant to reach 100% across all tasks prior to the termination of the intervention phase. The participants met mastery criterion on all three tasks in an average of 3.25 sessions. Finally, all participants were able to maintain their performance of 90-100% correct independent task completion during maintenance (follow-up) probes assessed at 1, 2, 4 and 10-week after the last instructional session and both Kevin and Ted were able to generalize learning to a novel setting and materials when assessed 10-weeks after intervention phase was terminated.

The results of the social validity questionnaires completed by both participants and their teachers indicate a favorable reaction to the SDVP intervention, a willingness to use technology in the future to learn/teach other vocational skills and a belief that the iPod Touch® uploaded with the FPS application is an effective instructional tool.

Table 10. *Mean percentage of steps completed independently across participants, tasks, and phases of the intervention.*

Participants	Tasks	Baseline	Intervention	Follow-Up
	Make Photocopies	15	97.5	97.5
Kevin	Set Table	28	100	100
	Fold Pizza Boxes	22	100	100
	Sort Mail	15	100	100
Ted	Make Coffee	12.5	93.3	97.5
	Fold Pizza Boxes	0	97.5	95
	Sort Mail	30	100	100
Mark	Fold Pizza Boxes	27.5	90	100
	Make Coffee	25	92	96.6
	Sort Mail	0	100	100
Ed	Make Coffee	0	100	96.6
	Fold Pizza Boxes	0	96.6	100

CHAPTER 5

DISCUSSION

Employment is an influential factor in the quality of life for individuals with intellectual and developmental disabilities (Lewis, 2011), but securing and maintaining employment is difficult. According to the U. S. Department of Labor (2013), the rate of employment for individuals with a disability was 30% while the rate of employment for those without a disability was 76%. According to the American Community Survey (2011), the percentage of working-age people with an intellectual disability working full-time/full year was only 11% (Erickson, Lee, & von Schrader, 2012). Why are employers reluctant to hire and retain workers with disabilities? Kaye and colleagues (2011) found that employers stated the following reasons for hesitating to hire individuals with disabilities: (a) cost of accommodations, (b) need for supervision, (c) lack of skill, and (d) inability to perform a quality job.

Existing research suggests individuals with disabilities can benefit from vocational training delivered via affordable assistive technology (Furrnis et al., 2001). Using commercially available handheld touch screen technology as assistive technology has the potential to reduce employers' cost of providing accommodations by equipping workers with tools designed to teach them vocational skills, thereby enabling them to produce and maintain high quality performance with minimal need for direct supervision.

The primary purpose of this research was to determine the effectiveness of self-directed video prompting (SDVP) using commercially available and affordable handheld touch screen technology (an iPod Touch®) to enable transition age students with autism spectrum disorder and intellectual disabilities to acquire and maintain novel vocational

skills. Also, the research was designed to measure the ability of each participant to transfer prompt dependence from others in their environment to the device and to record the participant and teacher recognition of the value of the SDVP intervention.

To show the effectiveness of using SDVP intervention with transition age students with autism spectrum disorder and intellectual disabilities, a single subject experimental design was implemented and the results were compared across participants, tasks and settings. Baseline levels of independent correct responding were assessed and compared to levels of functioning during intervention, maintenance (follow-up) and generalization phases. Participants and teachers completed questionnaires about their opinions to determine the social validity of the SDVP intervention.

Results indicated that all four participants were able to acquire and maintain vocational skills, independently operate a handheld device from beginning-to-end, and transfer prompt dependence from the trainer to a handheld device. All participants assessed 10-weeks after the intervention phase ended were able to successfully generalize newly acquired skills to untrained settings and materials at 100% accuracy. Teachers and participants rated the SDVP intervention positively and stated they wanted to use it again in the future.

Implications

Results of this research demonstrated the effectiveness of using handheld touch screen technology to enable the acquisition of skills necessary to independently complete three novel vocational tasks to stakeholder satisfaction. Results of this research corroborated and extended the existing self-directed video prompting literature.

SDVP Intervention

This research demonstrated that transition age students with autism spectrum disorder and a mild intellectual disability can be successfully taught to use self-directed video prompting to independently acquire and maintain vocationally relevant skills. This research took its selected participants beyond the achievements of the 18 video prompting studies that were reviewed (10 of which were self-directed video prompting studies) where only Van Laarhoven et al. (2009) attempted to train one participant to operate the prompting device from start-up. This implies that special education students can learn the critical skills employers require (independence, self-monitoring, reliability, quality control, etc) which should increase their presence in the workforce.

Although all of the participants in the current research required the use of video feedback at least once during their attempts to acquire specific vocational skills, all four participants were able to successfully acquire at least one new vocationally relevant skill using SDVP alone. These results lend support for SDVP intervention becoming an evidence-based practice. Additionally, the results of the current research provide evidence that students with both autism spectrum disorder and a mild intellectual disability can be taught to use self-directed video prompting early in the transition process (starting in middle school). By the time they exit the school system they could be familiar and comfortable using handheld touch screen technology to acquire novel skills which could provide an easier transition for these young adults into the workforce and potentially increase the national percentage of individuals with an intellectual disability working full-time/full year.

Prompt Dependence

This research demonstrated that prompt dependence upon a trainer can be reduced. Some individuals with disabilities may remain reliant upon job coaches or coworkers; however, when educators are able to teach these students to self-operate their prompting device, thereby transferring prompt dependence, this reduces future employer's negative perceptions of individuals with disabilities as being subpar candidates for competitive employment. The reduction of prompt dependence upon others at the workplace reduces the need for direct instruction and supervision, thereby lessening the burden upon resources freeing up the job coach or supervisor to work with more employees. When individuals with autism spectrum disorder and intellectual disabilities have successfully transferred prompt dependence from others in their environment to a handheld device for instructional support, this helps to address barriers that have led to the historical underrepresentation of this population of individuals in the workforce. It is critical that students exiting the school system have the skill set that employers are seeking; therefore, special education teachers and researchers must find alternative supports to increase their students' functional independence in everyday life.

Cost, Time and Effort

This research addressed several barriers identified by other researchers. More specifically, some of the barriers identified by Van Laarhoven et al. (2010) to implementing video prompting are the perception of it as being too costly, time consuming and difficult to implement. The perception of value, where the benefit exceeds the cost/effort (which can be measured by social validity ratings) is a leading indicator of the likelihood that a practitioner will sustain an intervention with high

treatment fidelity without prematurely discontinuing the intervention prior to skill development. The current research assessed the attitudes and opinions of both teachers and students toward the value of the current SDVP intervention. The results indicate that both groups view the intervention positively and want to use it again in the future which implies that the barriers have been surmounted.

Customized devices have been developed to meet the needs of many individuals with significant disabilities, but these devices are often very costly which reduces their availability to low income families. Equipping teachers and job coaches with low-cost, easy-to-use technology that encourages students to take ownership of their own learning is not unreasonable given the advances in commercially available handheld touch screen technology and easily downloadable software that support self-directed video prompting. It is vital we use technology that the majority of the population can afford in order to meet the goal of special education to improve the quality of life of individuals with disabilities. This was accomplished in the current research by using technology commonly found in the school district and in several of the participants' homes (the iPod Touch®) combined with the low-cost FPS software application which can be downloaded for less than five dollars ($4.99). No specialized video equipment was required since the video clips were recorded directly into the FPS application platform using the iPod Touch®. Therefore, based upon teacher ratings collected from the social validity questionnaires, it appears that the SDVP intervention was considered to be a reasonable intervention that can be implemented in the teacher's classroom with the technology currently available to them.

Not only was the current research deemed to be affordable, the SDVP intervention data shows that it was both efficient and effective, while teachers rated it as easy to implement and students rated it as easy to use. Specifically, the video clips took approximately one hour to create once the primary investigator became familiar with the process. A set of video clips were created for each vocational task and was used by multiple participants, thus eliminating the time consuming process of customizing each set of video clips to the individual research participant. Once a library of video clips has been created it has the potential of being widely disseminated among practitioners, parents and employers interested in using SDVP intervention. Results suggests that vocational tasks videoed in one setting may be universally used in other settings without deleterious effects as evidenced by multiple participants in the current research successfully using the same video clips to acquire vocational skills in different settings. This further reduces the time and effort (labor) required to implement the SDVP intervention. Additional support for the SDVP intervention being an efficient use of time and resources comes from the amount of effort required to implement the intervention with positive outcomes. That is, individual sessions typically took no more than 15 minutes to implement and all four of the participants were able to meet the mastery criterion within 3 to 5 sessions.

Extending the Literature

The results of the current research contribute to the video prompting literature that is focused on teaching participants to self-operate prompting devices to acquire vocational skills. More specifically, the present research corroborates the findings of Van Laarhoven et al. (2009) and extends the literature by demonstrating that transition age

students with multiple disabilities (autism spectrum disorder and an intellectual disability) can acquire several vocational skills, can learn to self-operate an iPod Touch® from beginning-to-end (including charging the device), can maintain high levels of accuracy 10-weeks after instruction and can learn to generalize their newly learned skills to novel settings and materials. In addition, the handheld touch screen prompting device (iPod Touch®) used by participants during this research is commonly used by the general public and is commercially available, thereby reducing the cost and stigma associated with its use as an assistive technology support. The use of Apple iOS based touch screen technology (including iPod Touch®) is common, well accepted and may significantly reduce the reliance on others and the need for a job coach in the vocational setting. That is, the iPod Touch® appears to facilitate independence and self-management by actively involving the student in his/her own learning while minimizing disruptions and/or distractions to others; thereby addressing several of the barriers to employment identified by Kaye, Jans, and Jones (2011) in their research on the attitudes and beliefs of employers toward individuals with disabilities.

Limitations

Although the results of this research demonstrate the effectiveness of using SDVP intervention to increase independent responding and reduce the need for prompts to use technology across all participants using commercially available technology, several limitations warrant discussion. These include limitations related to the participants' characteristics and motivation, technology and data collection.

Sample Size and Participant Characteristics

Although video-based instruction via the iPod Touch® appears to be an effective instructional tool, generalization of the findings may be limited due to the small sample size (n=4) and unique characteristics of the participants (severity of disability, gender, experience, etc.). This research included only male participants with autism spectrum disorder and mild intellectual disabilities. Also, while none of the participants had prior experience using video-based instruction, several had previous experience using touch screen technology (i.e., smart phones, tablets, etc.).

Participant Motivation

According to Bandura (1965) observational learning involves four stages: attention, retention, motor reproduction and motivation. All of the participants were able to attend to a 20-second video clip, retain the information or watch the short video clip again, and imitate the actions viewed in the video clips; however, the mere availability of the video prompts was not always sufficient to motivate the participant to comply with performing the task. As indicated by Bandura, if a participant chooses to ignore the clip (1st stage of observational learning) or not take the action, he/she will not learn from video prompting (Brewer and Wann, 1998). Bandura highlighted the importance of reinforcement on both attention and motivation on whether a behavior will be learned and thus performed. Motivation was a minor issue for one participant (Mark) in this research. He seemed to be distracted on several occasions during the intervention phase and this had an impact on his performance; however, his teacher (unbeknownst to the researcher) began providing him with an incentive to watch the clips. Once he began actively watching the video clips his performance improved. This implies that for some

individuals the motivation to watch video clips to acquire additional skills might have to be increased with external reinforcement.

Technological Changes

Any software can have periodic updates or upgrades which can impact a student's ability to use the technology. For example, the version of FPS (the video prompting software application) used for this research to integrate the video task lists and to provide the graphical user interface was incompatible with a new version of Apple iOS which caused problems for that FPS version and it was subsequently taken "off the shelf" of the Apple Apps store. Although this occurred, the researcher used an older version of iOS and FPS, and so it did not impact the research other than to make the primary investigator concerned about the possibility of the application software becoming inoperable due to an unforeseen incident and not being able to complete the research. Eventually, after working with staff at the Conover Company, a new version for the latest Apple iOS was made available in the Apple Apps store at a reduced price ($4.99) and the primary investigator's concerns were abated.

Maintenance Data Collection

The reporting of maintenance (follow-up) data is inconsistent in the existing video prompting literature (11 out of 18) and so the current research was designed to address this limitation. Follow-up or maintenance data was collected for all participants; however, it was not collected for each participant at each interval (1, 2, 4, and 10-weeks) after the final intervention session due to unforeseeable factors (25% of planned sessions were skipped due to school closures, absences, etc.). Additionally, it would have been more compelling to have collected additional maintenance probes farther out in time.

Also, although some readers may believe it was a limitation to collect maintenance (follow-up) data using the prompting device, the intent was not to fade device use but rather to transfer prompt dependence from the external change agent (e.g., teacher, job coach, etc.) to a portable piece of age-appropriate and socially acceptable technology while maintaining a high degree of accuracy and independent performance.

Generalization Data Collection

The reporting of generalization data is underrepresented in the existing video prompting literature (1 out of 18); therefore, the current research was designed to address this limitation. Unfortunately, due to time constraints (end of the school year), generalization data was collected on only a subset of tasks and two of the four participants did not move into their generalization phase.

Future Research

The findings of the current research suggest several areas for future investigation, including researching the effects of the SDVP intervention on a larger number of qualified individuals in a variety of environments across time while comparing alternative software platforms.

SSED Research Replication

To hold true to the methodology and commitment of researchers using single subject experimental designs to establish evidence-based practices, additional research is necessary to determine if the results found in this research can be replicated (Byiers, Reichle & Symons, 2012). The current research was conducted in the naturalistic setting of a rural school district; therefore, the number of qualified candidates was limited. While many in the research community view randomized control trials (RCTs) as the "gold

standard" for validating research, single subject experimental designs (SSEDs) have proven to be ideal for investigating interventions in applied settings such as those in this research. Therefore, additional research should be done using SSED to systematically evaluate the effects of the intervention across a variety of participants, tasks and settings.

Participant Characteristics

The prevalent use of handheld touch screen technology by elementary age students without disabilities and the popularity of learning novel skills from You-Tube videos, future researchers should investigate the effectiveness of the SDVP intervention with pre-transition age students with autism spectrum disorder and intellectual disabilities; thereby, building upon results from the current research which demonstrated that the middle school age participants were capable of learning new skills with this intervention.

Research should be extended to include students who traditionally require more exposure, practice and training in multiple environments to gain skills similar to their less impaired peer to determine if this commercially available handheld touch screen technology relieves the burden (cost, time and effort) on trainers. Will students with autism spectrum disorder and moderate-to-severe intellectual disabilities transfer prompt dependence to a handheld touch screen device or will they remain dependent upon traditional teaching strategies?

Social Validity

The current research was able to demonstrate positive post-intervention stakeholder perceptions; however, to assess whether stakeholder perceptions of SDVP intervention changed over the course of the research project it will be important that

future researchers implement both a pre-intervention and post-intervention questionnaire. Additionally, it will be important to address employer opinions and perceptions regarding the use of SDVP on the job site.

Longitudinal Outcomes

It is important to continue to assess the individual performance of participants across time and analyze what components contribute to the individual's long-term success. That is, much of the existing research in the area of video prompting focuses upon short-term maintenance of skills (e.g., only up to 3 months after instruction); therefore, a longitudinal research across multiple years beginning in middle school and ending with success in the workforce would contribute to our current knowledge. What really happens over time? Do the participants continue to use the video clips or do they naturally begin to fade their reliance upon these clips? Van Laarhoven et al. (2009) found that their participant began to self-fade his reliance upon the video clips and when he needed more support he would go back to watching the video clips as needed. Sigafoos et al. (2007) systematically began fading their participants' reliance upon individual video clips by merging or combining video clips into larger multi-step units. While all three of the participants were able to fade their reliance upon the need for individual video clips and were successfully performing tasks using the 1-chunk video clip (video modeling), their performance began to deteriorate over time when this support was withdrawn. Future research should compare the performance of individuals exposed to a systematic fading process versus those who begin to fade their reliance on their own. Will it be necessary to maintain the use of a handheld device and how will this differ along the continuum of severity of disabilities? Will they continue to use the device to

learn new skills? Will they accumulate skills over time that makes them a more valuable employee? Will this technology be widely accepted by employers in the workplace? It would also be interesting if a specific set of participant characteristics could be identified to assist educators in the selection of the most efficient level of support needed to acquire new skills.

Vocational Support Skills

Future research should include training individuals to learn necessary vocational support skills in order to facilitate their ability to maintain a job. For instance, vocational support skills might include the ability to ride public transportation to and from work, the ability to maintain hygiene and dress appropriately for work demands, the ability to use socially acceptable workplace behavior, the ability to tell time and use time-management skills, etc. These support skills are critical to maintaining employment and capturing the benefit from acquiring vocational skills.

Generalization to Multiple Environments

The current research was implemented over several months with positive results; however, the setting was confined to the school environment (middle school, high school and 18+ program). To be most effective, individuals would need to be able to learn and use that knowledge in multiple environments. While the current research demonstrated that several participants were able to generalize skills learned in one setting to another setting, it would be valuable to determine if participants could utilize this learning in other environments such as at their workplace or in other locations within their community. Future research is needed to determine if self-directed video prompting instruction can be extended to other areas such as recreational skills. It would be

interesting to determine if students taught the basic skills to operate a handheld device at school would then be able to acquire skills at home.

Specific Software Platforms

Finally, future research should investigate the use of a variety of video prompting software applications (e.g., FPS vs Impromptu) on the participant's ability to acquire novel skills. Does the specific software platform have an impact on the rate of acquisition? Does it make a difference that some applications have embedded cues directing the individual toward the next action to be taken, while others do not? Will critical stakeholders have a preference for using one platform over another?

Although this research provided evidence that transition age students with autism spectrum disorder and a mild intellectual disability can be taught to independently operate a handheld touch screen device to acquire vocational skills, several questions arose that need to be answered by future research.

Summary

It was shown that self-directed video prompting was effective at increasing correct and independent step completion across three vocational tasks for all four participants. By providing the participants with the necessary assistive technology to support the acquisition of novel skills, this intervention has moved the field of special education one step closer to achieving the goals laid out in IDEA for educators to successfully transition their students into life beyond high school and equip their students with the skills necessary to live as independently as possible. The use of technology to promote independence and self-management in the workplace is not new; however, this research provides another source of evidence that self-directed video prompting using

handheld touch screen technology (an iPod Touch® in this case) can be used effectively to teach transition age students with autism spectrum disorder and mild intellectual disabilities to acquire, maintain and generalize novel vocational tasks in multiple settings (middle school, high school and 18+ program). In addition to increasing vocationally relevant skills, the SDVP intervention reduced their reliance upon others in the environment and increased the teacher's confidence in the individual's ability to complete the task with a high degree of accuracy and independence.

Although major stakeholders in the schools (both teachers and students) are beginning to acknowledge the value of self-directed video prompting as an easy to use, affordable intervention that is highly efficient and effective, barriers still remain in the minds of potential employers. Therefore, additional research is warranted given the outcomes of the NLTS-2 and the legal mandate to prepare special education students for life beyond high school.

The current research directly answered four main questions. Transition age students with autism spectrum disorder and a mild intellectual disability were able to use self-directed video prompting to acquire novel vocational skills which required them to independently complete complex chained tasks. They were able to maintain their performance levels over time with the use of the handheld device without additional prompts from the trainer and were able to generalize those skills to untrained settings and materials. Additionally, stakeholders considered the SDVP intervention to be affordable, efficient and effective. In fact, several teachers and students could not wait to use it in the future. Therefore, while the results of this research should be considered in light of

stated limitations, it provides additional support toward self-directed video prompting becoming an established evidence-based intervention.

APPENDICES

APPENDIX A

TASK STEPS

Make Photocopies:

1. Gather materials and bring them to the copier.
2. Make sure the printer is on.
3. Place document print side up into the feeder tray and leave the folder on top.
4. Select 2-sided to 2-sided copy.
5. Press the number "2" to indicate the number of copies wanted.
6. Press the green start button and wait for the copies to be made.
7. Remove the documents from the return trays and place them into the folder.
8. Press the yellow "reset" button.
9. Fold the copies, put them into the yellow envelope and put them into the folder.
10. Take the folder over to the mailboxes and place it into the box labeled "Irene Jones."

Set Table:

1. Gather materials and bring them to the table.
2. Put the tablecloth on the table.
3. Put the place mat on the table.
4. Put the salt & pepper shaker on the table above the placemat.
5. Put the plates on the placemat.
6. Put the napkin to the left of the dinner plate.
7. Put the fork on top of the napkin.
8. Put the knife to the right of the dinner plate.
9. Put the spoon to the right of the knife.
10. Put the glass in the top right corner of the placemat.

Fold Pizza Boxes:

1. Orient unfolded pizza box brown side up with hooks pointing toward your body.
2. Fold bottom left & right sides inward while running hands across to create a crease.
3. Fold bottom center tab toward the inside of the box to create a crease.
4. Insert front left hook into hole until secure.
5. Insert front right hook into hole until secure.
6. Insert back left hook into hole until secure.
7. Insert back right hook into hole until secure.
8. Fold left & right sides of the lid inward while running hands across to create a crease.
9. Fold center tab on lid inward to create a crease.
10. Close lid with all tabs inside box.

Sort Mail:

1. Take mail out of the basket & sort letters into 3 separate piles on the counter according to type of envelop.
2. Find Mr. Jones' white envelope and place it in his box.
3. Find Mr. Reyes' white envelope and place it in his box.
4. Find Mr. Smith's white envelope and place it in his box.
5. Find Mr. Jones' small yellow envelope and place it in his box.
6. Find Mr. Reyes' small yellow envelope and place it in his box.
7. Find Mr. Smith's small yellow envelope and place it in his box.
8. Find Mr. Jones' large yellow envelope and place it in his box.
9. Find Mr. Reyes' large yellow envelope and place it in his box.
10. Find Mr. Smith's large yellow envelope and place it in his box.

Make Coffee:

1. Gather ingredients and materials and set them next to the coffee pot.
2. Lift the filter basket lid and rotate water spout over reservoir.
3. Place the paper filter into the brewing basket.
4. Measure and add coffee ground to the brewing basket.
5. Rotate water spout over the brewing basket.
6. Add water into the coffee pot to the 12 cup mark.
7. Fill reservoir with water from the coffee pot and place coffee pot on the burner.
8. Lower the filter basket lid.
9. Plug the coffee pot power cord into the wall outlet.
10. Press the black power button to the right until the green light glows.

APPENDIX B

DATA COLLECTION FORMS

Baseline Report

Student:_____ Date:_____
Trainer:_____ IOA:_____

Instructional Cue: "Use your iPod to [Task Name]"

Step	Performance	Error Correction Procedures	Technology Prompts
A. Retrieve the iPod Touch® from its docking station	+ / I		T_1 / T_2
B. Press & hold button on top until you see the apple, then wait for lock screen to appear	+ / I		T_1 / T_2
C. Finger swipe the "side to unlock" prompt	+ / I		T_1 / T_2
D. Once the home screen appears tap the FPS ✓ "app"	+ / I		T_1 / T_2
E. Press the "work activity" arrow	+ / I		T_1 / T_2
F. Press the [task name] activity arrow	+ / I		T_1 / T_2
G. Press the "view tasks" button	+ / I		T_1 / T_2
H_1. Press the step [step number] arrow & watch the video clip of the task step	+ / I		T_1 / T_2
I_1. Place the iPod Touch® on the table	+ / I		T_1 / T_2
Step 1.	+ / I	-	
J_1. Pick up iPod & press the "task completed" button	+ / I		T_1 / T_2
K_1. Press the "okay" button when it appears	+ / I		T_1 / T_2
H_2. Press the step [step number] arrow & watch the video clip of the task step	+ / I		T_1 / T_2
I_2. Place the iPod Touch® on the table	+ / I		T_1 / T_2
Step 2.	+ / I	-	
J_2. Pick up iPod & press the "task completed" button	+ / I		T_1 / T_2
K_2. Press the "okay" button when it appears	+ / I		T_1 / T_2
H_3. Press the step [step number] arrow & watch the video clip of the task step	+ / I		T_1 / T_2
I_3. Place the iPod Touch® on the table	+ / I		T_1 / T_2
Step 3.	+ / I	-	
J_3. Pick up iPod & press the "task completed" button	+ / I		T_1 / T_2
K_3. Press the "okay" button when it appears	+ / I		T_1 / T_2
H_4. Press the step [step number] arrow & watch the video clip of the task step	+ / I		T_1 / T_2
I_4. Place the iPod Touch® on the table	+ / I		T_1 / T_2
Step 4.	+ / I	-	
J_4. Pick up iPod & press the "task completed" button	+ / I		T_1 / T_2
K_4. Press the "okay" button when it appears	+ / I		T_1 / T_2
H_5. Press the step [step number] arrow & watch the video clip of the task step	+ / I		T_1 / T_2
I_5. Place the iPod Touch® on the table	+ / I		T_1 / T_2

Step 5.	+ / +I	-	
J_5. Pick up iPod & press the "task completed" button	+ / +I		T_1 / T_2
K_5. Press the "okay" button when it appears	+ / +I		T_1 / T_2
H_6. Press the step [step number] arrow & watch the video clip of the task step	+ / +I		T_1 / T_2
I_6. Place the iPod Touch® on the table	+ / +I		T_1 / T_2
Step 6.	+ / +I	-	
J_6. Pick up iPod & press the "task completed" button	+ / +I		T_1 / T_2
K_6. Press the "okay" button when it appears	+ / +I		T_1 / T_2
H_7. Press the step [step number] arrow & watch the video clip of the task step	+ / +I		T_1 / T_2
I_7. Place the iPod Touch® on the table	+ / +I		T_1 / T_2
Step 7.	+ / +I	-	
J_7. Pick up iPod & press the "task completed" button	+ / +I		T_1 / T_2
K_7. Press the "okay" button when it appears	+ / +I		T_1 / T_2
H_8. Press the step [step number] arrow & watch the video clip of the task step	+ / +I		T_1 / T_2
I_8. Place the iPod Touch® on the table	+ / +I		T_1 / T_2
Step 8.	+ / +I	-	
J_8. Pick up iPod & press the "task completed" button	+ / +I		T_1 / T_2
K_8. Press the "okay" button when it appears	+ / +I		T_1 / T_2
H_9. Press the step [step number] arrow & watch the video clip of the task step	+ / +I		T_1 / T_2
I_9. Place the iPod Touch® on the table	+ / +I		T_1 / T_2
Step 9.	+ / +I	-	
J_9. Pick up iPod & press the "task completed" button	+ / +I		T_1 / T_2
K_9. Press the "okay" button when it appears	+ / +I		T_1 / T_2
H_{10}. Press the step [step number] arrow & watch the video clip of the task step	+ / +I		T_1 / T_2
I_{10}. Place the iPod Touch® on the table	+ / +I		T_1 / T_2
Step 10.	+ / +I	-	
J_{10}. Pick up iPod & press the "task completed" button	+ / +I		T_1 / T_2
K_{10}. Press the "okay" button when it appears	+ / +I		T_1 / T_2
L. Press bottom center button on the iPod Touch® to return you to the home page	+ / +I		T_1 / T_2
M. Plug the iPod Touch® to its docking station	+ / +I		T_1 / T_2
Total			

Recording Key:

+	= Independent correct responding w/o device	T_1	= Trainer implemented a prompt for technology use
+I	= Independent correct responding with device	T_2	= Trainer implemented a controlling prompt for technology use
+VF	= Correct responding after reviewing video clip (video feedback)		
-CP	= Trainer implemented second level of 2-step hierarchy (controlling prompt)		

Student:_____ Date:_____
Trainer:_____ IOA:_____

Instructional Cue: "Use your iPod to [Task Name]"

Step	Performance	Error Correction Procedures	Technology Prompts
A. Retrieve the iPod Touch® from its docking station	+/+I		T_1/T_2
B. Press & hold button on top until you see the apple, then wait for lock screen to appear	+/+I		T_1/T_2
C. Finger swipe the "side to unlock" prompt	+/+I		T_1/T_2
D. Once the home screen appears tap the FPS ✓ "app"	+/+I		T_1/T_2
E. Press the "work activity" arrow	+/+I		T_1/T_2
F. Press the [task name] activity arrow	+/+I		T_1/T_2
G. Press the "view tasks" button	+/+I		T_1/T_2
H_1. Press the step [step number] arrow & watch the video clip of the task step	+/+I		T_1/T_2
I_1. Place the iPod Touch® on the table	+/+I		T_1/T_2
Step 1.	+/+I	+VF/-CP	
J_1. Pick up iPod & press the "task completed" button	+/+I		T_1/T_2
K_1. Press the "okay" button when it appears	+/+I		T_1/T_2
H_2. Press the step [step number] arrow & watch the video clip of the task step	+/+I		T_1/T_2
I_2. Place the iPod Touch® on the table	+/+I		T_1/T_2
Step 2.	+/+I	+VF/-CP	
J_2. Pick up iPod & press the "task completed" button	+/+I		T_1/T_2
K_2. Press the "okay" button when it appears	+/+I		T_1/T_2
H_3. Press the step [step number] arrow & watch the video clip of the task step	+/+I		T_1/T_2
I_3. Place the iPod Touch® on the table	+/+I		T_1/T_2
Step 3.	+/+I	+VF/-CP	
J_3. Pick up iPod & press the "task completed" button	+/+I		T_1/T_2
K_3. Press the "okay" button when it appears	+/+I		T_1/T_2
H_4. Press the step [step number] arrow & watch the video clip of the task step	+/+I		T_1/T_2
I_4. Place the iPod Touch® on the table	+/+I		T_1/T_2
Step 4.	+/+I	+VF/-CP	
J_4. Pick up iPod & press the "task completed" button	+/+I		T_1/T_2
K_4. Press the "okay" button when it appears	+/+I		T_1/T_2
H_5. Press the step [step number] arrow & watch the video clip of the task step	+/+I		T_1/T_2
I_5. Place the iPod Touch® on the table	+/+I		T_1/T_2

Step 5.	+ / +I	+VF / -CP	
J_5. Pick up iPod & press the "task completed" button	+ / +I		T_1 / T_2
K_5. Press the "okay" button when it appears	+ / +I		T_1 / T_2
H_6. Press the step [step number] arrow & watch the video clip of the task step	+ / +I		T_1 / T_2
I_6. Place the iPod Touch® on the table	+ / +I		T_1 / T_2
Step 6.	+ / +I	+VF / -CP	
J_6. Pick up iPod & press the "task completed" button	+ / +I		T_1 / T_2
K_6. Press the "okay" button when it appears	+ / +I		T_1 / T_2
H_7. Press the step [step number] arrow & watch the video clip of the task step	+ / +I		T_1 / T_2
I_7. Place the iPod Touch® on the table	+ / +I		T_1 / T_2
Step 7.	+ / +I	+VF / -CP	
J_7. Pick up iPod & press the "task completed" button	+ / +I		T_1 / T_2
K_7. Press the "okay" button when it appears	+ / +I		T_1 / T_2
H_8. Press the step [step number] arrow & watch the video clip of the task step	+ / +I		T_1 / T_2
I_8. Place the iPod Touch® on the table	+ / +I		T_1 / T_2
Step 8.	+ / +I	+VF / -CP	
J_8. Pick up iPod & press the "task completed" button	+ / +I		T_1 / T_2
K_8. Press the "okay" button when it appears	+ / +I		T_1 / T_2
H_9. Press the step [step number] arrow & watch the video clip of the task step	+ / +I		T_1 / T_2
I_9. Place the iPod Touch® on the table	+ / +I		T_1 / T_2
Step 9.	+ / +I	+VF / -CP	
J_9. Pick up iPod & press the "task completed" button	+ / +I		T_1 / T_2
K_9. Press the "okay" button when it appears	+ / +I		T_1 / T_2
H_{10}. Press the step [step number] arrow & watch the video clip of the task step	+ / +I		T_1 / T_2
I_{10}. Place the iPod Touch® on the table	+ / +I		T_1 / T_2
Step 10.	+ / +I	+VF / -CP	
J_{10}. Pick up iPod & press the "task completed" button	+ / +I		T_1 / T_2
K_{10}. Press the "okay" button when it appears	+ / +I		T_1 / T_2
L. Press bottom center button on the iPod Touch® to return you to the home page	+ / +I		T_1 / T_2
M. Plug the iPod Touch® to its docking station	+ / +I		T_1 / T_2
Total			

Recording Key:

+	= Independent correct responding w/o device	T_1	= Trainer implemented a prompt for technology use
+I	= Independent correct responding with device	T_2	= Trainer implemented a controlling prompt for technology use
+VF	= Correct responding after reviewing video clip (video feedback)		
-CP	= Trainer implemented second level of 2-step hierarchy (controlling prompt)		

Procedural Fidelity Data Collection Form

Student:_____ Date:_____
Trainer:_____ PR:_____

Task Name:_____	Session	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8	Step 9	Step 10
Device Properly Charged & Docked											
Training Material Available											
Used Correct Reporting Forms											
Used Correct Video											
Issued Correct S^D											
Implemented Tech Prompt Correctly											
Implemented ECP Correctly											

Recording Key:
Record a "Y" if done correctly
Record an "N" if done incorrectly
Record "-" if not applicable

APPENDIX C

BASELINE PROCEDURES

Baseline Procedures

Steps
1. Trainer provides instructional cue: "[task name]."
2. If the task is completed correctly record a plus I (+I) on the data sheet.
3. If there is no attempt within 5 seconds of the S^D the trainer will block the participant's view and complete the step. A minus (-) is recorded on the data sheet.
4. If an error is made, the trainer will block the participant's view and complete the step. A minus (-) is recorded on the data sheet.
5. The trainer will prompt the participant to continue the task.
6. At the end of the session, non-specific verbal praise is given for participating.

Pre-Intervention Generalization Probe Procedures

Steps
1. Trainer provides instructional cue: "[task name]."
2. If the task is completed correctly record a plus I (+I) on the data sheet.
3. If there is no attempt within 5 seconds of the S^D the trainer will block the participant's view and complete the step. A minus (-) is recorded on the data sheet.
4. If an error is made, the trainer will block the participant's view and complete the step. A minus (-) is recorded on the data sheet.
5. The trainer will prompt the participant to continue the task.
6. At the end of the session, non-specific verbal praise is given for participating.

Note. The pre-intervention generalization probes took place prior to the implementation of the intervention phase.

APPENDIX D

OPERATING STEPS FOR IPOD TOUCH®

Steps for Operating the iPod Touch®

Steps
1. Retrieve the iPod Touch® from its docking station
2. Press & hold button on top until you see the apple, then wait for lock screen to appear
3. Finger swipe the "side to unlock" prompt
4. Once the home screen appears tap the FPS ✓ "app"
5. Press the "work activity" arrow
6. Press the [task name] activity arrow
7. Press the "view tasks" button
8. Press the step [step number] arrow & watch the video clip of the task step
9. Place the iPod Touch® on the table
10. Complete the task step
11. Once you've completed the step pick up iPod & press the "task completed" button
12. Press the "okay" button when it appears
13. Retrieve the iPod Touch®
14. Repeat steps 8-13 (swipe upward toward blue task bar when you reach task step 6)
15. Press bottom center button on the iPod Touch® to return you to the home screen
16. Plug the iPod Touch® to its docking station

APPENDIX E

INTERVENTION PROCEDURES

Intervention Procedures

Steps
1. Trainer provides instructional cue (S^D): "Use the iPod Touch® to [task name]."
2. If a technology prompt is required, the trainer will provide a gestural or verbal prompt to use the device. If the participant correctly completes the step a TP1 (TP_1) is recorded on the data sheet.
3. If a second technology prompt is required, the trainer will provide a controlling prompt to use the device and records a TP2 (TP_2) for that step.
4. If the task is completed correctly without the iPod Touch® the trainer records a plus (+) on the data sheet and reminds the participant to use the device.
5. If the task is completed correctly with the iPod Touch® the trainer records a plus I (+I) on the data sheet.
6. Within 5 seconds of viewing the video clip, if there is no attempt or an error is made, the trainer will prompt the participant to view the video clip again. If the participant correctly completes the step a plus VF (+VF) is recorded on the data sheet.
7. If the first error correction procedure (video feedback) failed to produce correct responding, the trainer will provide a controlling prompt to ensure correct responding and a minus CP (-CP) is recorded on the data sheet
8. This process will be repeated until all steps in the task analysis are completed.
9. At the end of the session, non-specific verbal praise is given for participating.

Post-Intervention Generalization Probe Procedures

Steps
1. Trainer provides instructional cue (S^D): "Use the iPod Touch® to [task name]."
2. If there is no attempt within 5 seconds of the S^D the trainer will block the participant's view and complete the step. A minus (-) is recorded on the data sheet.
3. If an error is made, the trainer will block the participant's view and complete the step. A minus (-) is recorded on the data sheet.
4. The trainer will prompt the participant to continue the task.
5. If the task is completed correctly without the iPod Touch® the trainer records a plus (+) on the data sheet and reminds the participant to use their device.
6. If the task is completed correctly with the iPod Touch® the trainer records a plus I (+I) on the data sheet.
7. At the end of the session, non-specific verbal praise is given for participating.

Note. The post-intervention generalization probes took place in an untrained setting with novel materials immediately after the participant completed the follow-up/maintenance phase.

Maintenance (Follow-up) Probe Procedures

Steps
1. Trainer provides instructional cue (S^D): "Use the iPod Touch® to [task name]."
2. If there is no attempt within 5 seconds of the S^D the trainer will block the participant's view and complete the step. A minus (-) is recorded on the data sheet.
3. If an error is made, the trainer will block the participant's view and complete the step. A minus (-) is recorded on the data sheet.
4. The trainer will prompt the participant to continue the task.
5. If the task is completed correctly without the iPod Touch® the trainer records a plus (+) on the data sheet and reminds the participant to use their device.
6. If the task is completed correctly with the iPod Touch® the trainer records a plus I (+I) on the data sheet.
7. At the end of the session, non-specific verbal praise is given for participating.

Note. The maintenance probes took place at 1, 2, 4 and 10 weeks after the participant reached the mastery criterion.

APPENDIX F

SOCIAL VALIDITY QUESTIONNAIRES

Social Validity Inventory for Teachers

Teacher:_____ Date:_____

1 = Strongly Disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly Agree

Statements	**Ranking**
The SDVP intervention easy to implement	1 2 3 4 5
The SDVP intervention taught the participant new job skills	1 2 3 4 5
The SDVP intervention increased the participant's independence	1 2 3 4 5
The SDVP intervention was beneficial to the participants	1 2 3 4 5
Participant seemed to enjoy using the iPod Touch® to learn new skills	1 2 3 4 5
I would like to use this intervention with other students in the future	1 2 3 4 5
I would recommend the SDVP intervention to my colleagues	1 2 3 4 5

Social Validity Inventory for Participants

Participant:_____ Date:_____

1 = Yes 2 = Maybe 3 = No

Question	Ranking
Did the iPod Touch® help you learn new job skills?	1 2 3
Were you able to work on your own using the iPod Touch®?	1 2 3
Did you enjoy learning with the Touch®?	1 2 3
Would you like to learn new skills using the iPod Touch®?	1 2 3
Do you think your friends would like to use the iPod Touch®?	1 2 3

REFERENCES

Alberto, A. P., Cihak, D. F., & Gama, R. I. (2005). Use of static picture prompts versus video modeling during simulation instruction. *Research in Developmental Disabilities, 26*, 327-339. doi:10.1016/j.ridd.2004.11.002

American Psychiatric Association. (2013). Intellectual disability fact sheet, 1-2. Retrieved from http://www.dsm5.org

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.

Ayres, K., & Cihak, D. (2010). Computer and video-based instruction of food preparation skills: Acquisition, generalization, and maintenance. *Intellectual and Developmental Disabilities, 48*(3), 195-208.

Ayres, K. M., Maguire, A., & McClimon, D. (2009). Acquisition and generalization of chained tasks taught with computer based video instruction to children with autism. *Education and Training in Developmental Disabilities, 44*(4), 493-508.

Baker, S. D., Lang, R., & O'Reilly, M. (2009). Review of video modeling with students with emotional and behavioral disorders. *Education and Treatment of Children, 32*(3), 403-420.

Bandura, A. (1986). *Social Foundations of Thought and Action: A Social Cognitive Approach.* Englewood Cliff, NJ: Prentice Hall.

Belva, B. C., & Matson, J. L. (2013). An examination of specific independent living skills deficits in adults with profound intellectual disabilities. *Research in Developmental Disabilities, 34,* 596-604.

*Bereznak, S., Ayres, M., Mechling, L. C., & Alexander, J. L. (2012). Video self-prompting and mobile technology to increase independent living and vocational independence for students with Autism Spectrum Disorders. *Journal of Developmental and Physical Disabilities, 24*, 269-285. doi: 10.1007/s10882-012-9270-8

Blackorby, J., & Wagner, M. (1996). Longitudinal postschool outcomes of youth with disabilities: Findings from the National Longitudinal Transition Study. *Exceptional Children, 62*(5), 399-413.

Blanchett, W. J. (2001). Importance of teacher transition competencies as rated by special educators. *Teacher Education and Special Education: The Journal of the Teacher Education Division of the Council for Exceptional Children, 24*(1), 3-12. doi: 10.1177/088840640102400103

Bouck, E. C. (2012). Secondary students with moderate/severe intellectual disability: Considerations of curriculum and post-school outcomes from the National Longitudinal Transition Study-2. *Journal of Intellectual Disability Research, 56*(12), 1175-1186. doi:10.1111/j.1365-2788.2011.01517.x

Brewer, K. R., & Wann, D. L. (1998). Observational learning effectiveness as a function of model characteristics: Investigating the importance of social power. *Social Behavior and Personality, 26*(1), 1-10.

Briel, L., & Getzel, E. (2009). Postsecondary options for students with autism. In P. Wehman, M. D. Smith, & C. Schall (Eds.), *Autism & the Transition to Adulthood: Success Beyond the Classroom* (pp. 189-231). Baltimore, Maryland: Paul H. Brookes Publishing Co.

Burke, J. C., & Cerniglia, L. (1990). Stimulus complexity and autistic children's responsivity: Assessing and training a pivotal behavior. *Journal of Autism and Developmental Disorders, 20*(2), 233-253.

Byiers, B. J., Reichle, J., & Symons, F. J. (2012). Single-subject experimental design for evidence-based practice. *American Journal of Speech-Language Pathology, 21*(4), 397-414. doi: 10.1044/1058-0360(2012/11-0036)

*Cannella-Malone, H. I., Brooks, D. G., & Tullis, C. A. (2013). Using self-directed video prompting to teach students with intellectual disabilities. *Journal of Behavior Education, 22*, 169-189. doi: 10.1007/s10864-013-9175-3

Cannella-Malone, H. I., Fleming, C., Chung, Y., Wheeler, G. M., Basbagill, A. R., & Singh, A. H. (2011). Teaching independent living skills to seven individuals with severe intellectual disabilities: A comparison of video prompting to video modeling. *Journal of Positive Behavior Interventions, 13*(3), 144-153. doi: 10.1177/1098300710366593

*Cannella-Malone, H., Sigafoos, J., O'Reilly, M., de la Cruz, B., Edrisinha, C., & Lancioni, G. E. (2006). Comparing video prompting to video modeling for teaching independent living skills to six adults with developmental disabilities. *Education and Training in Developmental Disabilities, 41*(4), 344-356.

*Cannella-Malone, H. I., Wheaton, J. E., Wu, P., Tullis, C. A., & Park, J. H. (2012). Comparing the effects of video prompting with and without error correction on skill acquisition for students with intellectual disability. *Education and Training in Autism and Developmental Disabilities, 47*(3), 332-344.

Chan, J. M., Lambdin, L., Van Laarhoven, T., & Johnson, J. W. (2013). Teaching leisure skills to an adult with developmental disabilities using a video prompting intervention package. *Education and Training in Autism and Developmental Disabilities, 48*(3), 412-420.

Charlop-Christy, M., Le, L., & Freeman, K., (2000). A comparison of video modeling with in vivo modeling for teaching children with autism. *Journal of Autism and Developmental Disorders, 30*(6), 537-552.

Cihak, D., Alberto, P. A., Taber-Doughty, T., & Gama, R. I. (2006). A comparison of static picture prompting and video prompting simulation strategies using group instructional procedures. *Focus on Autism and Other Developmental Disabilities, 21*(2), 89-99. doi: 10.1177/10883576060210020601

Connis, R. (1979). The effects of sequential pictorial cues, self-recording, and praise on the job task sequencing of retarded adults. *Journal of Applied Behavior Analysis, 12*(3), 355-361.

Cooper, J. C., Heron, T. E., & Heward, W. L. (2007). *Applied Behavior Analysis 2nd Edition.* Upper Saddle River, NJ: Prentice Hall.

Copeland, S. R., & Hughes, C. (2000). Acquisition of a picture prompt strategy to increase independent performance. *Education and Training in Mental Retardation and Developmental Disabilities, 35*(3), 294-305.

Davis, C. A., Brady, M. P., Williams, R. E., & Burta, M. (1992). The effects of self-operated auditory prompting tapes on the performance fluency of persons with severe mental retardation. *Education and Training in Mental Retardation, 27*, 39-50.

Erickson, W. Lee, C., & von Schrader, S. (2012). 2011 Disability status report: United States. Ithaca, NY: Cornell University Employment and Disability Institute (EDI). Retrieved from www.disabilitystatistics.org

Furniss, F., Lancioni, G., Rocha, N., Cunha, Bernardo, Seedhouse, P., Morato, P., & O'Reilly, M. (2001). VICAID: Development and evaluation of a palmtop-based job aid for workers with severe developmental disabilities. *British Journal of Educational Technology, 32*(3), 277-287.

*Goodson, J., Sigafoos, J., O'Reilly, M., Cannella, H., & Lancioni, G. E. (2007). Evaluation of a video-based error correction procedure for teaching a domestic skill to individuals with developmental disabilities. *Research in Developmental Disabilities, 28*, 458-467. doi: 10.1016/j.ridd.2006.06.002

*Graves, T. B., Collins, B. C., Schuster, J. W., & Kleinert, H. (2005). Using video prompting to teach cooking skills to secondary students with moderate disabilities. *Education and Training in Mental Retardation and Developmental Disabilities, 40*(1), 34-46.

Grossi, T. A. (1998). Using a self-operated auditory prompting system to improve the work performance of two employees with severe disabilities. *The Journal of the Association for Persons with Severe Handicaps, 23*(2), 149-154.

Hammond, D. L., Whatley, A. D., Ayres, K. M., & Gast, D. L. (2010). Effectiveness of video modeling to teach iPod use to students with moderate intellectual disabilities. *Education and Training in Autism and Developmental Disabilities, 45*(4), 525-538.

Haring, T. G., Kennedy, C. H., Adams, M. J., & Pitts-Conway, V. (1987). Teaching generalization of purchasing skills across community settings to autistic youth using videotaped modeling. *Journal of Applied Behavior Analysis, 20*(1), 89-96.

*Horn, J. A., Miltenberger, R. G., Weil, T., Mowery, J., Conn, M., & Sams, L. (2008). Teaching laundry skills to individuals with developmental disabilities using video prompting. *International Journal of Behavioral Consultation and Therapy, 4*(3), 279-286.

Horner, R.. D., & Baer, D. M. (1978). Multiple-probe technique: A variation of the multiple baseline. *Journal of Applied Behavior Analysis, 11*, 189-196.

Horner, R. H., Carr, E. G., Halle, J., McGee, G., Odom, S., & Wolery, M. (2005). The use of single-subject research to identify evidence-based practice in special education. *Exceptional Children, 71*(2), 165-179.

Individuals with Disabilities Education Act of 1990, P.L. 101-476, § 602a, 20 U. S.C., 1401

Individuals with Disabilities Education Improvement Act of 2004, H.R. 1350, 108th Congress.

Jennes-Coussens, M., Magill-Evan, J., & Koning, C. (2006). The quality of life of young men with Asperger syndrome: A brief report. *Autism, 10*(4), 403-414. doi: 10.1177/1362361306064432

*Johnson, J., Blood, E., Freeman, A., & Simmons, K. (2013). Evaluating the effectiveness of teacher-implemented video prompting on an iPod Touch to teach food-preparation skills to high school students with Autism Spectrum Disorders.

Focus on Autism and Other Developmental Disabilities, 28(3), 147-158. doi: 10.1177/1088357613476344

Kagohara, D. (2011). Three students with developmental disabilities learn to operate an iPod to access age-appropriate entertainment videos. *Journal of Behavioral Education, 20*(1), 33-43. doi: 10.1007/s10864-010-9115-4

Kaye, H. S., Jans, L. H., & Jones, E. C. (2011). Why don't employers hire and retain workers with disabilities? *Journal of Occupational Rehabilitation, 21*, 526-536. doi: 10.1007/s10926-011-9302-8

Kennedy, C. H. (2005). *Single-Case Design for Educational Research*. United States: Pearson Education, Inc.

Krantz, P. J., MacDuff, M. T., & McClannahan, L. E. (1993). Programming participation in family activities for children with autism: Parents' use of photographic activity schedules. *Journal of Applied Behavior Analysis, 26*(1), 137-138.

Lancioni, G. E., O'Reilly, M., & Campodonico, F. (2002). Promoting fluency of performance of self-help tasks with a person with multiple disabilities. *Behavioral Interventions, 17*, 15-20. DOI: 10.1002/bin.101

Le Grice, B., & Blampied, N. M. (1994). Training pupils with intellectual disability to operate educational technology using video prompting. *Education and Training in Mental Retardation and Developmental Disabilities, 29*, 321-330.

Lewis, S. (2011). The current state of employment of persons with intellectual and developmental disabilities. *Committee on Health, Education, Labor and Pensions United States Senate*. Retrieved from http://www.hhs.gov/asl/testify/2011/03/t20110302a.html

Matson, J. L., Rivet, T. T., Fodstad, J. C., Dempsey, T., & Boisjoli, J. A. (2009). Examination of adaptive behavior differences in adults with autism spectrum disorders and intellectual disability. *Research in Developmental Disabilities, 30*, 1317-1325. doi: 10.1016/j.ridd.2009.05.008

Masahiko, I., Akiko, I., & Shigeo, K. (1994). Training persons with developmental disabilities in cooking skills: The effects of a training program using cooking cards and an instructional video. *Japanese Journal of Special Education, 32*(3), 1-12.

Mechling, L. C. (2007). Assistive Technology as a self-management tool for prompting students with intellectual disabilities to initiate and complete daily tasks: A literature review. *Education and Training in Developmental Disabilities, 42*(3), 252-269.

Mechling, L. C. (2008). High tech cooking: A literature review of evolving technologies for teaching a functional skill. *Education and Training in Developmental Disabilities, 43*(4), 474-485.

*Mechling, L. C., Gast, D. L., & Fields, E. A. (2008). Evaluation of a portable DVD player and system of least prompts to self-prompt cooking task completion by young adults with moderate intellectual disabilities. *Journal of Special Education, 42*(3), 179-190. doi: 10.1177/0022466907313348

*Mechling, L. C., Gast, D. L., & Seid, N. H. (2009). Using a personal digital assistant to increase independent task completion by students with autism spectrum disorder. *Journal of Autism and Developmental Disorders, 39*, 1420-1434. doi: 10.1007/s10803-009-0761-0

*Mechling, L. C., & Gustafson, M. (2008). Comparison of static picture and video prompting on the performance of cooking-related tasks by students with autism. *Journal of Special Education Technology, 23*(3), 31-45.

*Mechling, L. C., & Gustafson, M. (2009). Comparison of the effects of static picture and video prompting on completion of cooking related tasks by students with moderate intellectual disabilities. *Exceptionality, 17*, 103-116. doi: 10.1080/09362830902805889

Mechling, L. C., & O'Brien, E. (2010). Computer-based video instruction to teach students with intellectual disabilities to use public bus transportation. *Education and Training in Developmental Disabilities, 45*(2), 230-241.

*Mechling, L. C., & Stephens, E. (2009). Comparison of self-prompting of cooking skills via picture-based cookbooks and video recipes. *Education and Training in Developmental Disabilities, 44*(2), 218-236.

Mesibov, G. B., Shea, V., & Schopler, E. (2004). *The TEACCH Approach to Autism Spectrum Disorders.* New York, NY: Springer.

Norman, J. M., Collins, B. C., & Schuster, J. W. (2001). Using an instructional package including video technology to teach self-help skills to elementary students with mental disabilities. *Journal of Special Education, 16*(3), 5-18.

*Payne, D., Cannella-Malone, H. I., Tullis, C. A., & Sabielny, L. M. (2012). The effects of self-directed video prompting with two students with intellectual and developmental disabilities. *Journal of Developmental and Physical Disabilities, 24*, 617-634. doi: 10.1007/s10882-012-9293-1

Prelock, P. A., Beatson, J., Bitner, B., Broder, C., & Ducker, A. (2003). Interdisciplinary assessment of young children with autism spectrum disorder. *Language, Speech, and Hearing Services in School, 34*, 194-202.

Rusch, F. R., & Kazdin, A. E. (1981). Toward a methodology of withdrawal designs for the assessment of response maintenance. *Journal of Applied Behavior Analysis, 2*, 131-140.

*Sigafoos, J., O'Reilly, M., Cannella, H., Edrisinha, C., de la Cruz, B., Upadhyaya, M., Lancioni, G. E., Hundley, A., Andrews, A., Garver, C., & Young, D. (2007). Evaluation of a video prompting and fading procedure for teaching dish washing skills to adults with developmental disabilities. *Journal of Behavioral Education, 16*(2), 93-109. doi: 10.1007/s10864-006-9004-z

*Sigafoos, J., O'Reilly, M., Cannella, H., Upadhyaya, M., Edrisinha, C., Lancioni, G. E., Hundley, A., Andrews, A., Garver, C., & Young, D. (2005). Computer-presented video prompting for teaching microwave oven use to three adults with developmental disabilities. *Journal of Behavioral Education, 14*(3), 189-201. doi: 10.1007/s10864-005-6297-2

Siperstein, G. N., Parker, R. C., & Drascher, M. (2013). National snapshot of adults with intellectual disabilities in the labor force. *Journal of Vocational Rehabilitation, 39*(3), 157-165. doi: 10.3233/JVR-130658

Sowers, J., Rusch, F. R., Connis, R. T., & Cummings, L. E. (1980). Teaching mentally retarded adults to time-manage in a vocational setting. *Journal of Applied Behavior Analysis, 13*(1), 119-128.

Sowers, J., Verdi, M., Bourbeau, P., & Sheehan, M. (1985). Teaching job independence and flexibility to mentally retarded students through the use of a self-control package. *Journal of Applied Behavior Analysis, 18*(1), 81-85.

Shukla-Mehta, S., Miller, T., & Callahan, K. J. (2010). Evaluating the effectiveness of video instruction on social and communication skills training for children with autism spectrum disorders: A review of the literature. *Focus on Autism and Other Developmental Disabilities, 25*(1), 23-36.

Stokes, T. F., & Baer, D. M. (1977). An implicit technology of generalization. *Journal of Applied Behavior Analysis, 10*(2), 349-367.

Thiemann, K. S., & Martin, G. L. (1989). Self-management with picture prompts to improve quality of household cleaning by severely mentally handicapped persons. *International Journal of Rehabilitative Research, 12*(1), 27-40.

Tiong, S. J., Blampied, N. M., & Le Grice, B. (1992). Training community-living, intellectually handicapped people in fire safety using video prompting. *Behavior Change, 9*(2), 65-72.

U.S. Department of Labor, Bureau of Labor Statistics. (2013). Labor force statistics from the current population survey. Retrieved from http://www.bls.gov/data/

*Van Laarhoven, T., Johnson, J. W., Van Laarhoven-Myers, T., Grider, K. L., & Grider, K. M. (2009). The effectiveness of using a video iPod as a prompting device in employment settings. *Journal of Behavioral Education, 18*, 119-141. doi: 10.1007/s10864-009-9077-6

*Van Laarhoven, T., Kraus, E., Karpman, K., Nizzi, R., & Valention, J. (2010). A comparison of picture and video prompts to teach independent living skills to individuals with autism. *Focus on Autism and Other Developmental Disabilities, 25*(4), 195-208. doi: 10.1177/1088357610380412

Van Laarhoven, T., & Van Laarhoven-Myers, T. (2006). Comparison of three video-based instructional procedures for teaching independent living skills to persons with developmental disabilities. *Education and Training in Developmental Disabilities, 41*(4), 365-381.

Van Laarhoven, T., Van Laarhoven-Myers, T., & Zurita, L. M. (2007). The effectiveness of using a pocket PC as a video modeling and feedback device for individuals with developmental disabilities in vocational settings. *Assistive Technology Outcomes and Benefits, 4*(1), 28-45.

Van Laarhoven, T., Zurita, L. M., Johnson, J. W., Grider, K. M., & Grider, K. L. (2009). Comparison of self, other, and subjective video models for teaching independent living skills to individuals with developmental disabilities. *Education and Training in Developmental Disabilities, 44*(4), 509-522.

Wacker, D. P., & Berg, W. K. (1983). The effects of picture prompts on the acquisition of complex vocational tasks by mentally retarded adolescents. *Journal of Applied Behavioral Analysis, 16*, 417-433.

Weber, J., & Scheuermann, B. (2008). *Educating Students with Autism: A Quick Start Manual.* Austin, TX: Pro-Ed.

Yell, M. L. (2012). *The Law and Special Education 3rd Edition.* Upper Saddle River, NJ: Pearson Education Inc.

Zisimopoulos, D., Sigafoos, J., & Koutromanos, G. (2011). Using video prompting and constant time delay to teach an internet search basic skill to students with intellectual disabilities. *Education and Training in Autism and Developmental Disabilities, 46*(2), 238-250.

* = Denotes research articles analyzed in the literature review

VITA

Irene Jones was born to Philias and Barbara Vincelette. After graduating from Freedom High School in 1988, Irene began her academic career in Germany while serving her country in the United States Army. After returning to the United States, Irene attended New Mexico State University where she earned a Bachelor of Arts in Psychology in 1995 and went on to earn a Masters of Education degree in School Psychology in 1998 from Texas State University. Irene has worked in a variety of environments from private (in-home) to public educational settings as a Licensed Specialist in School Psychology (LSSP) and as a Board Certified Behavior Analyst (BCBA). In 2011, Irene entered into the doctoral program and has studied under the supervision of Dr. Mark F. O'Reilly. While enrolled in the doctorate program, Irene was the 2011 recipient of the McNair Scholar Recruitment Fellowship, the 2012 recipient of the Long Graduate Fellowship, the 2013 recipient of the Fudell Endowed Presidential Scholarship and the 2015 Society for the Advancement of Behavior Analysis (SABA) Senior Student Presenter Grant. Irene reviewed multiple journal articles as part of a group effort by The National Professional Development Center on Autism Spectrum Disorders (ASD) to update and identify the latest Evidence-Based Practices for ASD. Additionally, she has presented at local, state, and national conferences on autism and behavior management.

Permanent address: 30108 Torrey Pine Circle, Georgetown, TX 78628

This dissertation was typed by the author.